AMBIRAD

AmbiRad Vision® VSX

Radiant Tube Heaters

Installation and Operating Manual

For use with all Vision VSX models with Generation code BB

INDEX **Section**

WARNINGS

Nortek Global HVAC (UK) Limited 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.

CE

Part No. D301024

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.

IMPORTANT NOTICE TO INSTALLERS

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

Additionally it may be necessary to protect the gas 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.

Document Index.

Introduction.

Welcome to the range of high efficiency infra-red 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 and assembly procedures must be carried out by suitable competent persons. Commissioning and service procedures must be carried out by suitable qualified persons to the statutory regulations in the country of use.

When assembling, installing, commissioning and servicing is undertaken on radiant tube heaters specified in these instructions, due care and attention is required to ensure that working at height regulations are adhered to at the mounting heights specified.

PLEASE READ this document prior to installation and use. The safety of this heater is guaranteed only by the correct usage in accordance with these instructions, therefore it is recommended that they are retained for future reference.

All Dimensions shown are in mm unless otherwise stated.

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

1. Installation Requirements.

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

1.1 Compliance notices

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

Gas Appliance Directive:	(90/396/ EEC)
Machinery Directive:	(2006/42/EC)
Low Voltage Directive:	(2006/95/EC)
Electromagnetic Compatibility Directive:	(2004/108/EC)
Product Liability Directive:	(85/374/EEC)

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 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 also 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 the instruction(s) can lead to not only component damage, but also to a hazardous situation being created where there is a risk of personal injury.

The Vision VSX Radiant Tube Heater conforms to the following harmonised standards:

EN 292 -1

Safety of Machinery - Basic Concepts, General Principles for Design Basic terminology, methodology EN 292-2

Safety of Machinery - Basic Concepts, General Principles for Design Technical Principles and Specifications.

EN 60204-1

Safety of Machinery - Electrical Equipment for Machines Specification for General Requirements.

EN 60335-1

Safety of Household and Similar Electrical Appliances General Requirements.

EN 55014

Limits and methods of measurement of radio disturbance characteristics of electrical motor-operated and thermal appliances for household and similar purposes, electrical tools and similar electric apparatus.

EN 50165

Electrical Equipment of non-electric heating appliances for household and similar purposes, safety requirements.

1.2 Certificates of conformity

Certificates are available from the manufacturer, address details are shown on the back page.

Notified body Pin reference is : 86CL180

1.3 General product information

The Vision VSX Radiant Tube Heaters have an input range from 20 kW to 50 kW and are suitable for ceiling hung or wall mounted via purpose built steel supports.

The Vision VSX Radiant Tube Heaters are available only available in U tube format, in either flued or un-flued configurations.

Ducted air inlet kits are also available for contaminated or dusty environments.

Each heater is fitted with a burner which has been test fired and pre-set prior to despatch. The safety functions of the burner are by way of a fully sequential control box fitted to the burner.

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.

1.4 Model Definitions

VSXUT = Vision High efficiency U Tube heater with painted powered burner, deep profile stainless steel reflector and end caps, reflector canopy and end caps in Aluzink

1.5 General requirements

Caution

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

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

Warning

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

Note

To ignore the warning a caution notices, and to ignore the advice from 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.

1.6 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 are not satisfied then contact should be made with the Sales Office at Nortek Global HVAC (UK) Limited as soon as possible by telephoning 01384 489250. 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.

1.7 Health and Safety

Warning

Vision radiant tube heaters must be installed in accordance with the latest versions of all applicable standards and local or national codes in force. The appliance must be used only in a sufficiently ventilated space, as specified in these instructions, and is not suitable for residential use.

Caution

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

1.8 Heater Suspension

See fig 1b. Attachment to the heater support lugs should be made by a 'speed link', D shackle or in the case of drop rods, a closed formed hook. The hanging attachments to overhead steelwork etc. must be purpose made to good sound engineering practice or of a proprietary type fixing. They must be adequately fixed and designed to carry the whole weight of the heater. In the event of suitable roof steelwork being unavailable, additional steelwork should be fitted to enable vertical hangers to be used for suspending the heaters.

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

The recommended mounting heights for VSX heaters are given in the table below.

The burner MUST be positioned on the right hand side of the heat exchanger and mounted on a level horizontal plane. See fig 1a.

Recommended Mountain Height (m)	
Model	**Horizontal**
20	5.5 - 8.0
25	6.0 - 9.0
30	6.5 - 10.0
35	7.0 - 11.0
40	7.5 - 12.0
45	8.0 - 13.0
50	8.5 - 14.0

Caution

The burner MUST be positioned on the right hand side of the heat exchanger and mounted on a level horizontal plane. See fig 1a

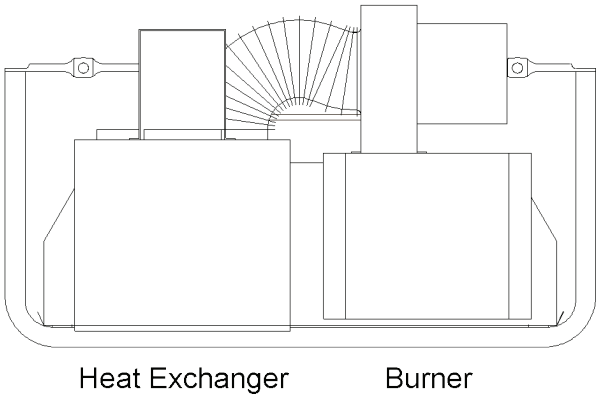
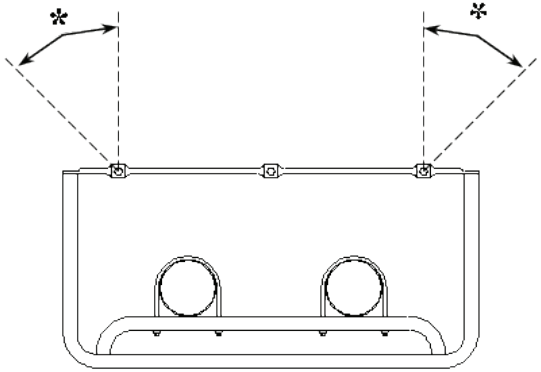


Fig. 1a. Burner positioned on right hand tube and on a horizontal plane.

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

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

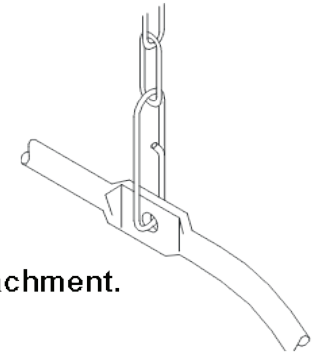


Vertical or inclined suspension on this plane is acceptable.

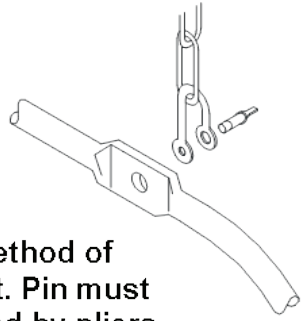
* These angles to be equal and not more than 45°.

fig. 1.b Recommended methods of heater suspension

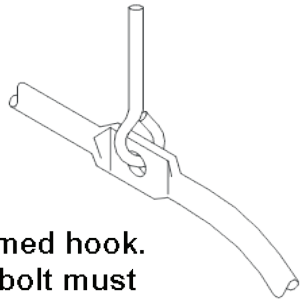
THE HEATER SHOULD SLOPE DOWNWARDS TOWARDS THE RETURN BEND
BY APPROX. 10mm FOR BOTH HORIZONTAL AND WALL MOUNTED INSTALLATIONS.



Typical Speedlink attachment.



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



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

1.9 Clearance to Combustibles

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

fig. 2 Diagram illustrating the clearance to combustibles

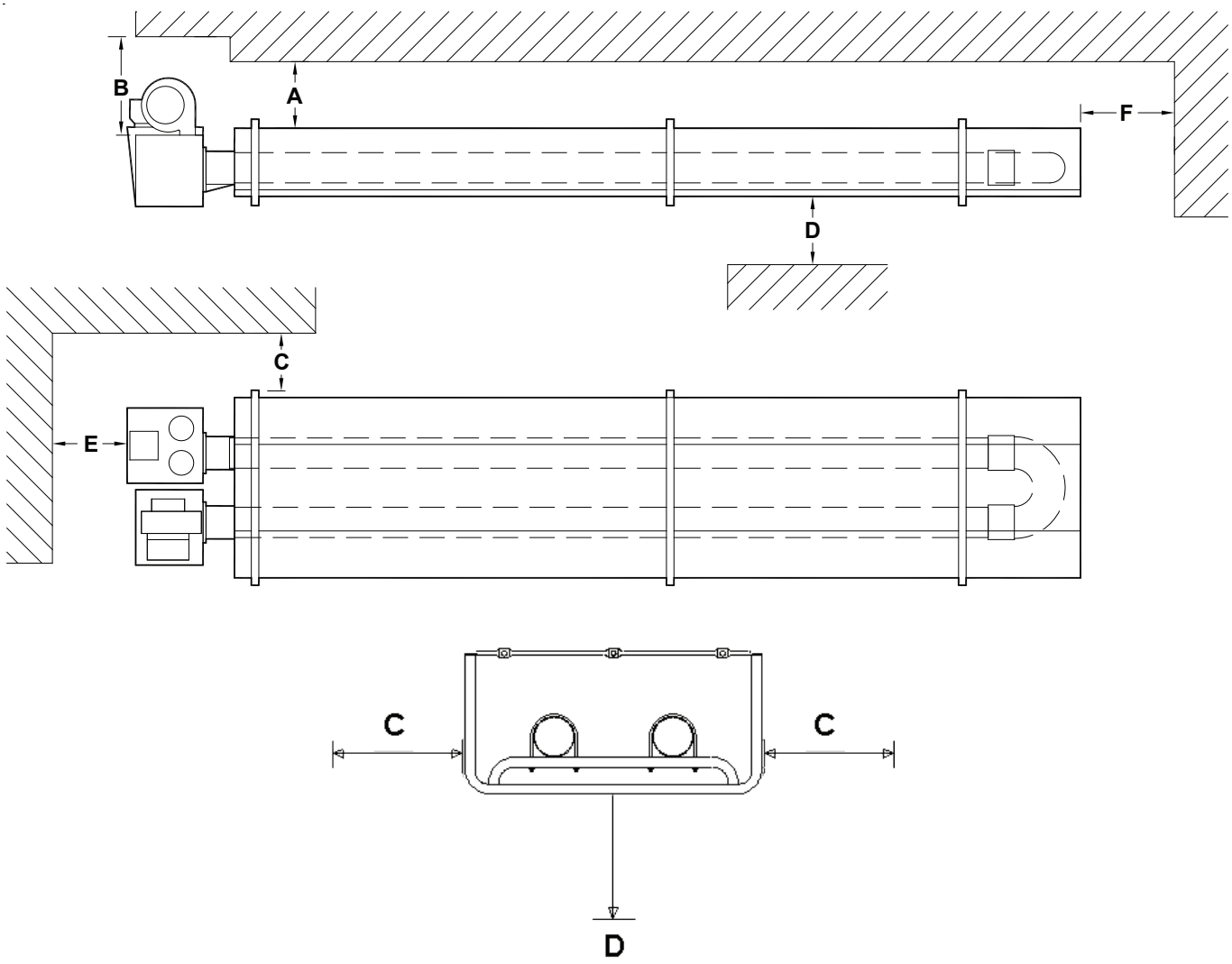


Table 1 Clearance to Combustibles

VSUT		20/25/30	35/40	45/50
Above Reflector	**A**	100	100	100
Above Burner / Heater Outlet	**B**	500	500	500
To the Sides	**C**	1300	1300	1300
Below Tubes	**D**	2300	2500	2500
Horizontally from Heater Outlet (un-flued)	**E**	1200	1200	1200
End Wall	**F**	700	700	700

1.10 Gas Connection and Supply

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

A competent or qualified engineer is required to either install a new gas meter to the service pipe or to check that the existing meter is adequate to deal with the rate of gas supply required. Installation pipes should be fitted inaccordance with National Standards,h so that the supply pressure, as stated in Table 4 will be achieved.

It is the responsibility of the competent engineer to ensure that other relevant Standards and Codes of Practice are complied with in the country of installation. Pipes of smaller size than the heater inlet gas connection must not be used. The complete installation must be tested for soundness as described in the country of installation.

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

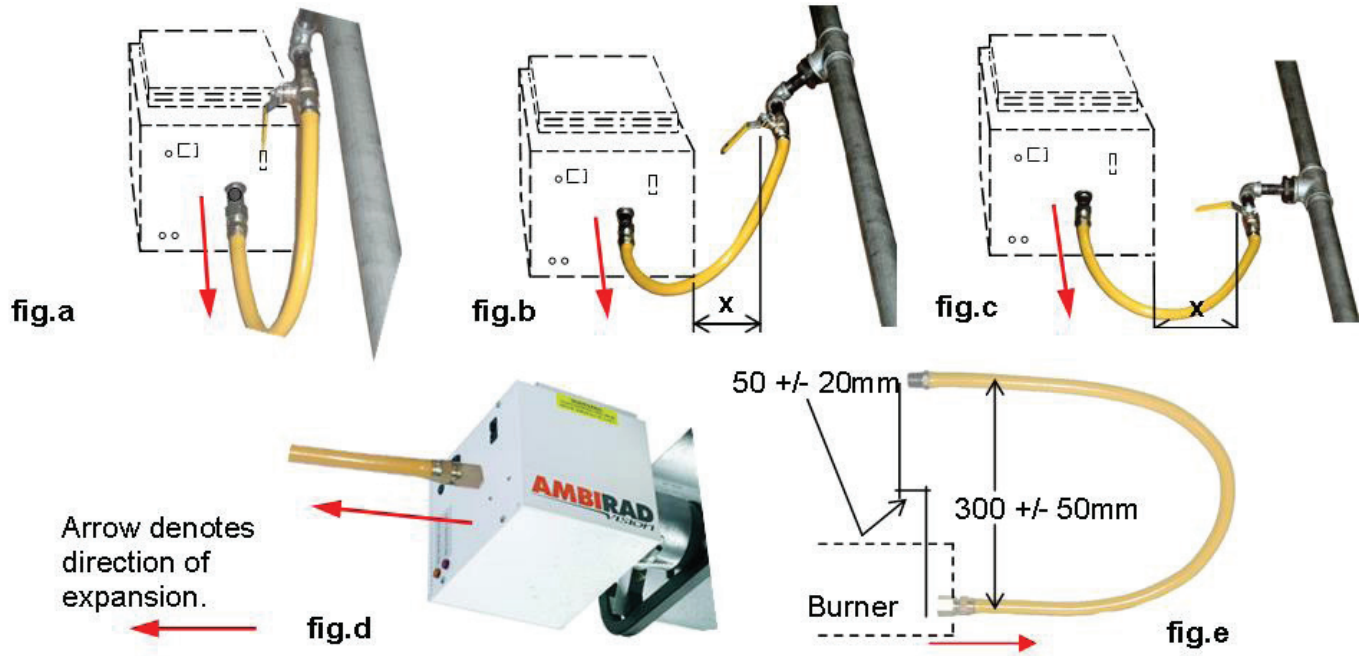
Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

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

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

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

fig. 3 Correct Installation of Flexible Gas Connection



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

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

Any other position in between these angles is acceptable.

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

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

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

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

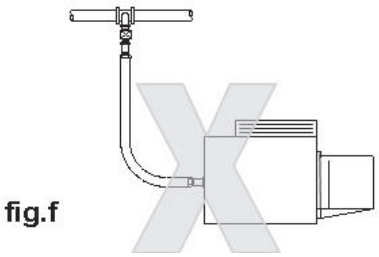


fig.f

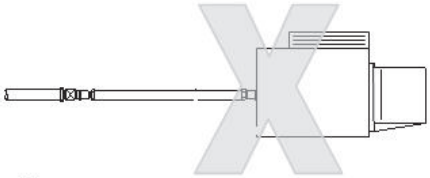


fig.g

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

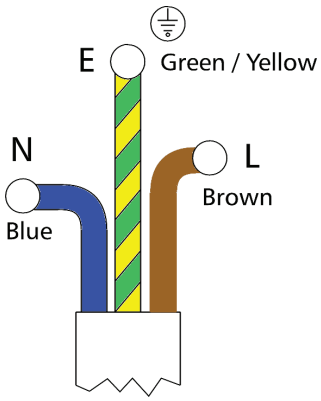
Table 2 Gas Supply Pressures

Gas Category	Gas Type	Nominal Pressure (mbar)	Max Supply Pressure (mbar)	Min Supply Pressure (mbar)
I2H/I2E	Nat Gas (G20)	20	25	17.5
I2E(R)B/I2Er	Nat Gas (G20/25)	20/25	25/30	17.5/20
I2L	Nat Gas (G25)	25	30	20

Gas Supply Connection R½ - ½in BSP Internal Thread

1.11 Electrical Connections

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



All electrical work should be carried out to 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 of 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 Nortek Global HVAC approved controls. Please refer to separate control manual for positioning and installation details.

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

fig.4 Typical wiring connections

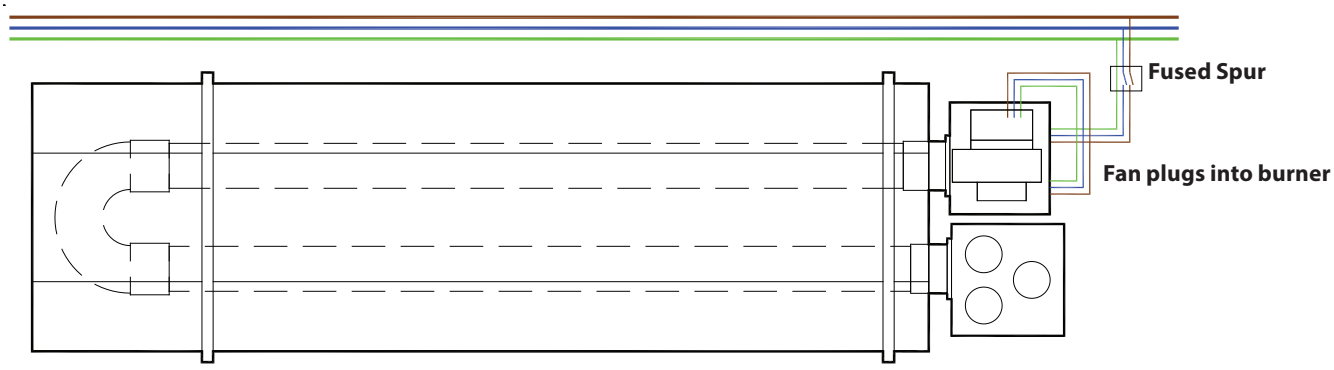


fig.5a VSX Internal Burner Wiring Diagram *(Optional Webber solenoid shown in dotted)*

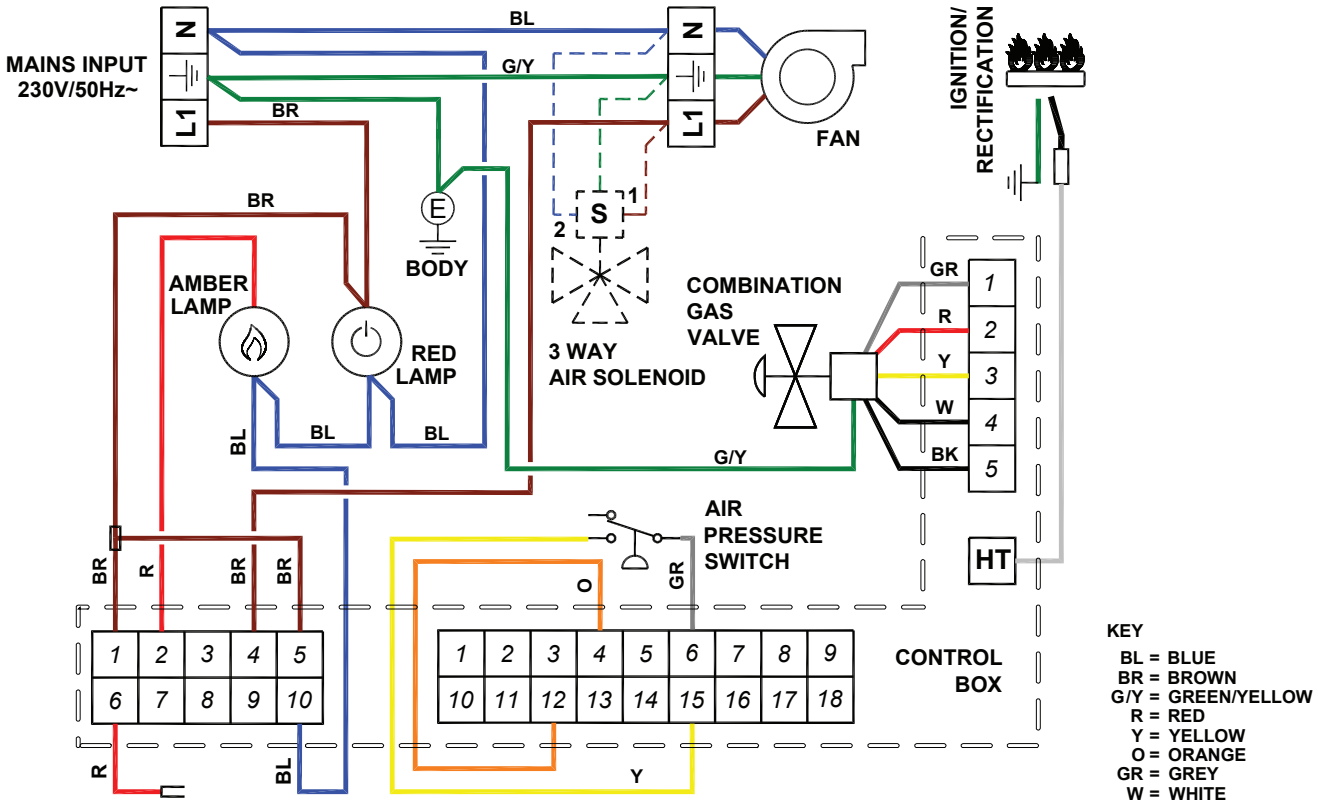
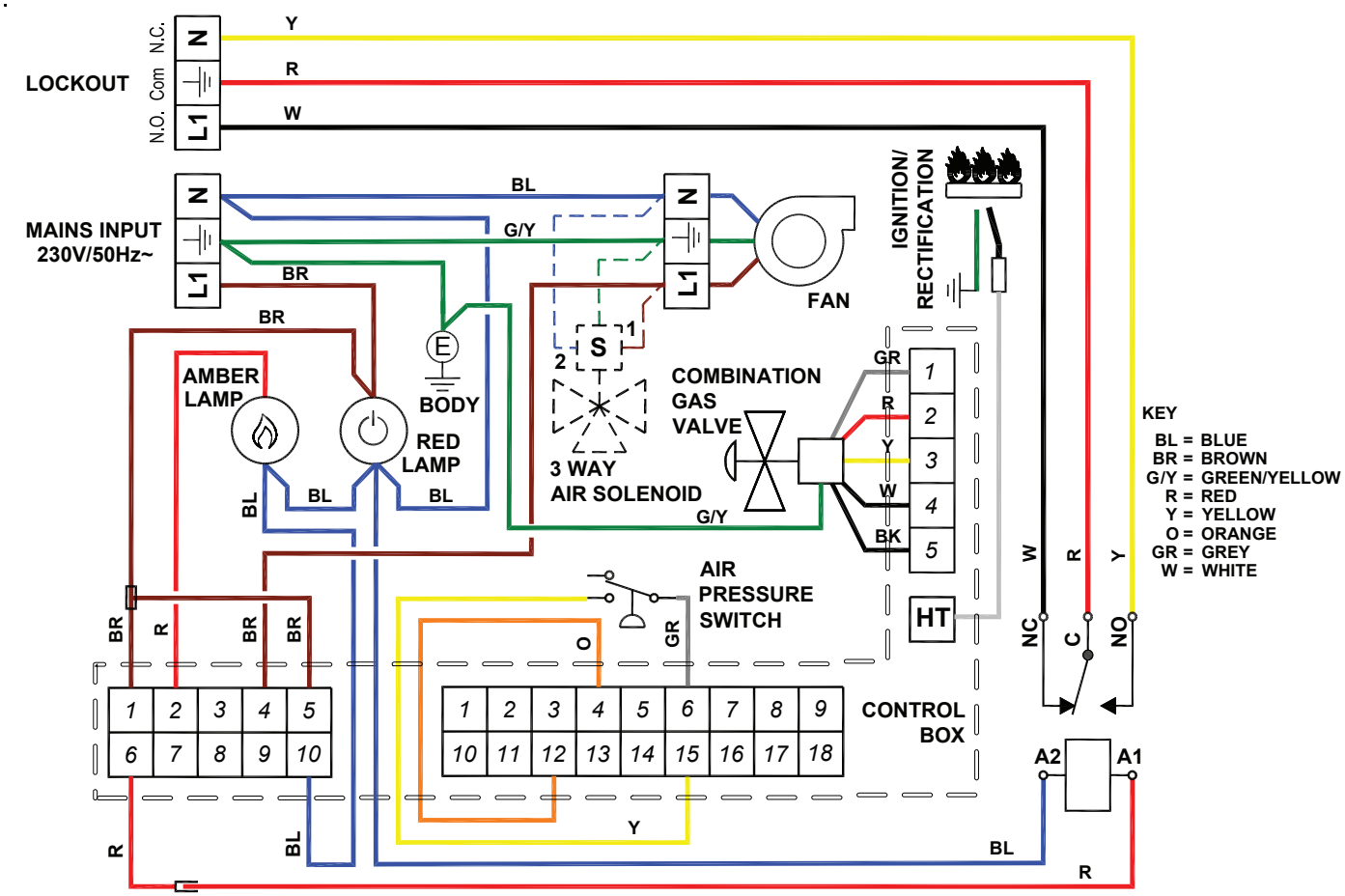


fig.5b VSX Internal Burner Wiring Diagram c/w Lockout Circuit *(Optional Webber solenoid shown in dotted)*



1.12 Ventilation Requirements

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

1.12.1 Un-flued Radiant Heater

Radiant tube heaters can be operated as un-flued appliances so that the 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 1.6). It should be ensured that the combustion gases do not impinge on any combustible materials.

Mechanical Ventilation

Mechanical ventilation must be rated a 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.

1.12.2 Flued Radiant Heater

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

1.13 Flue and Combustion Air Inlet

1.15.1.1 Details

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

Flue size 125mm diameter twin wall.

Flue systems can run either vertically or horizontally up to a maximum length of 9.5m (including up to 2 x 90° bends plus the terminal). The minimum flue length shall be 1m.

The flue system **must be terminated vertically** and in accordance with local regulations, National Standards, and the flue system manufacturers instructions as supplied with the flue.

1.13.2 Installation

Connection to the appliance which is not connected to the fuel supply may be carried out be 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 adequately supported from the building structure and installed in accordance with National Codes, and the flue system manufacturers instructions as supplied with the flue.

Condensate drain pipes must be protected against the effects of freezing.

1.13.3 Condensation

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

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

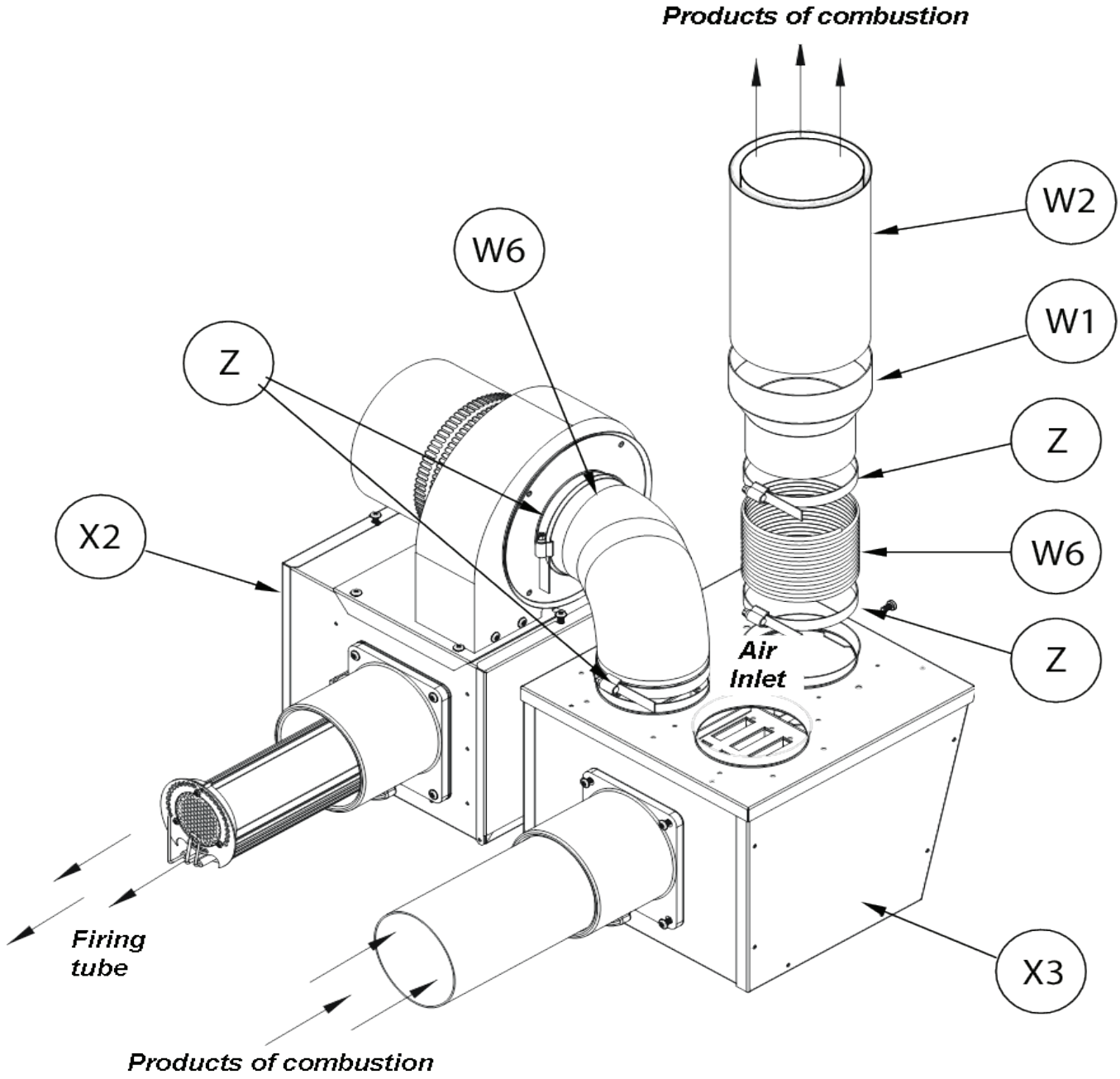
Where condensation is unavoidable traps should be included to encourage the condensates to flow freely to a point from which they may be released, preferably into a gully. The condensate pipe from the flue to the disposal point must be made from corrosion resistant pipe of not less than 25mm internal diameter.

1.13.4 Flue Connection

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

Figure 6.a. Forced Burner with Heat Exchanger (Standard Flue)

For flued products of combustion and no ducted air



Items	
W1	127mm (5ins) to 100mm (4ins) Flue Adaptor
W2	127mm (5ins) Twin Wall Flue Pipe
W6	100mm (4ins) Flexible Hose
X2	Forced Burner
X3	Heat Exchanger
Z	100mm (4ins) Clips x2

Maximum flue run = 9.5m @ Ø125mm

Maximum no of bends = 2

All flues must **terminate** vertically.

For further information on flue runs, please refer to section 1.9.1 and National Standards.

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

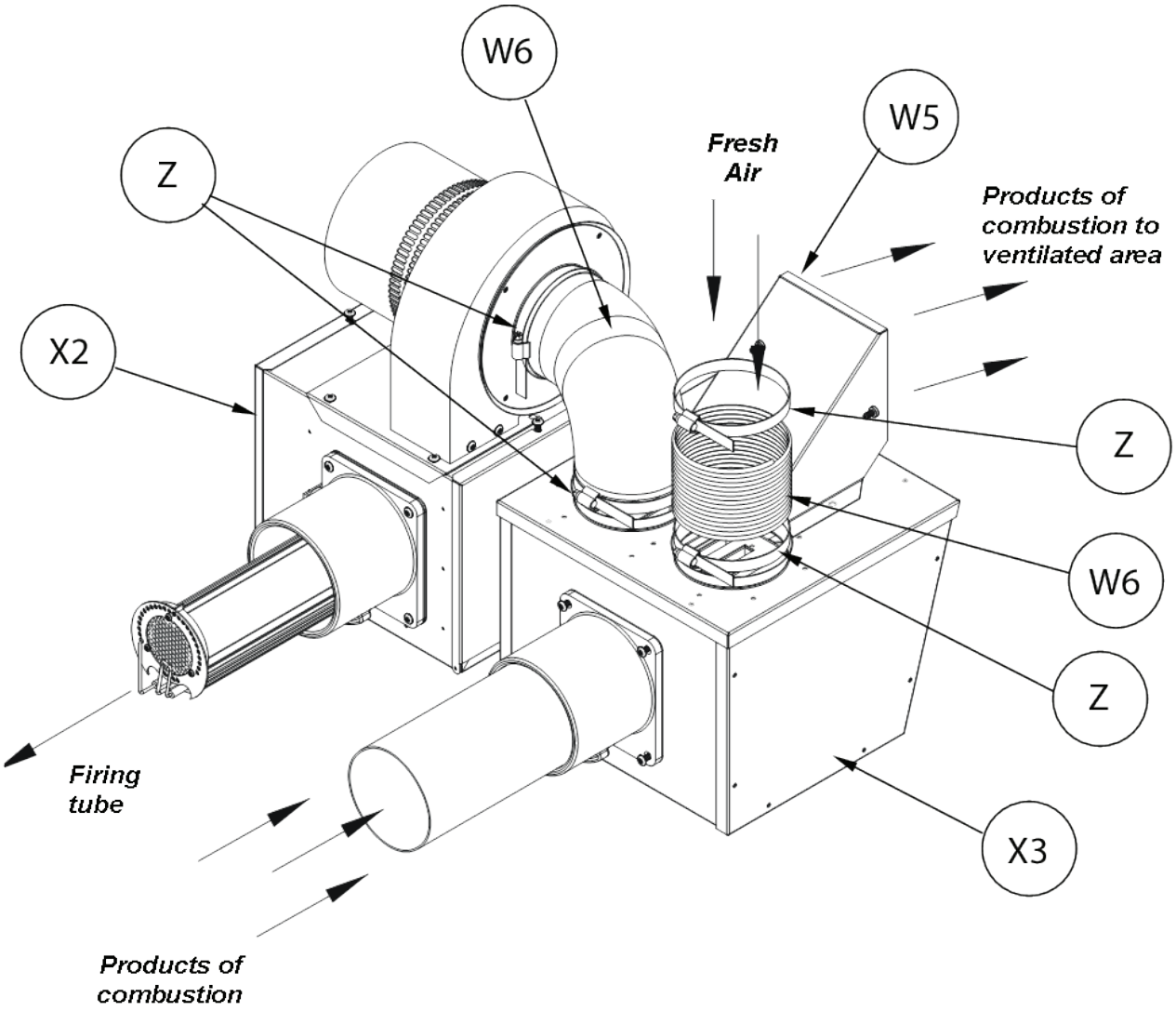
Minimum diameter = 100mm

Maximum no of bends = 2

Ventilation requirements are as detailed in section 1.7

Figure 6.b. Forced Burner with Heat Exchanger (No External Flue)

For ducted air and products of combustion to ventilated area



Maximum flue run = 9.5m @ Ø125mm

Maximum no of bends = 2

All flues must **terminate** vertically.

For further information on flue runs, please refer to section 1.10.1 and National Standards.

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

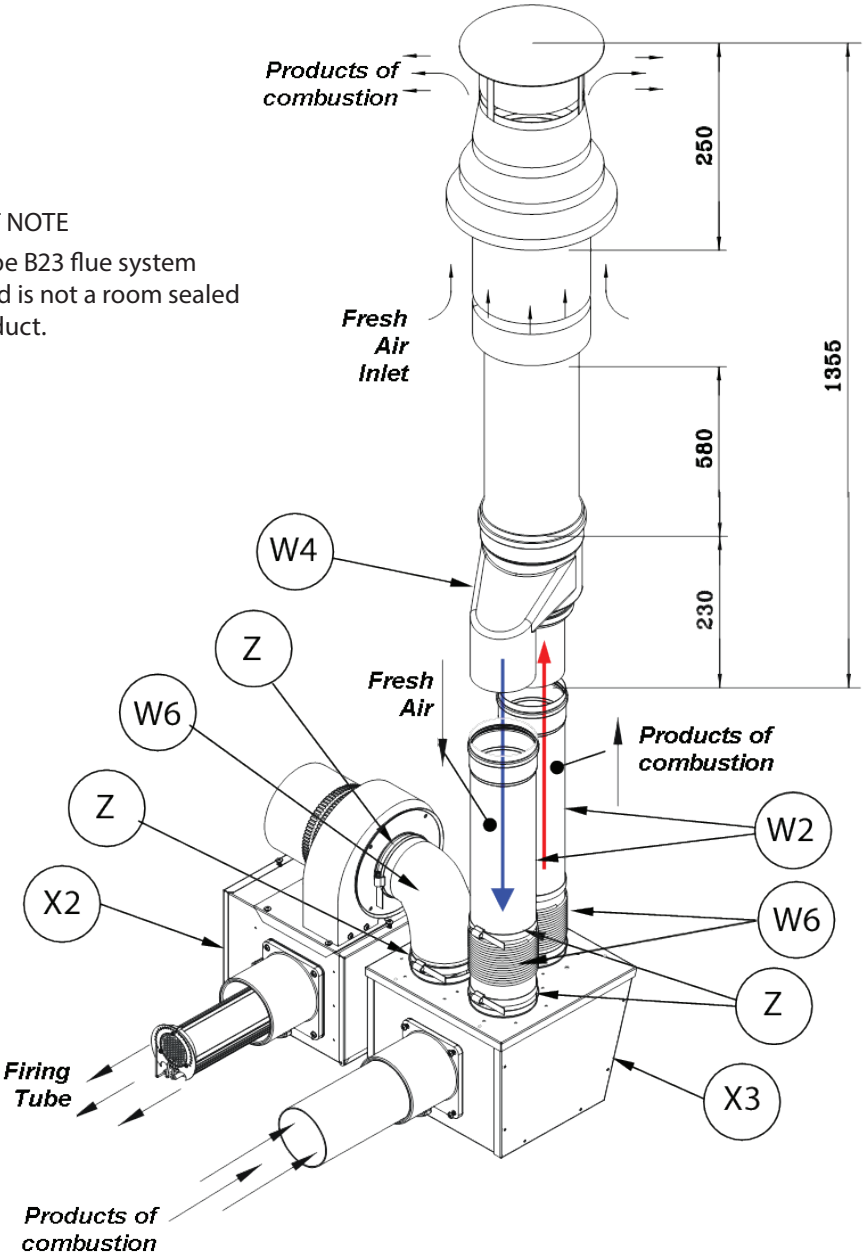
Maximum no of bends = 2

Items	
W5	Shroud for unflued heater installation
W6	100mm (4ins) Flexible Hose
X2	Forced Burner
X3	Heat Exchanger
Z	100mm (4ins) Clips x2

Ventilation requirements are as detailed in section 1.7

Figure 6.c. Forced Burner with Heat Exchanger (with Concentric Flue)

For flued products of combustion and ducted air via concentric pipe.



IMPORTANT NOTE

This option is a type B23 flue system with ducted air and is not a room sealed balanced flue product.

Items	
W2	Flue Extension optional (0.25m/0.5m/1.0m)
W4	Concentric Flue Terminal
W6	100mm (4ins) Flexible Hose
X2	Forced Burner
X3	Heat Exchanger
Z	100mm (4ins) Clips x2

Maximum flue length = 9.0m @ Ø125mm

Maximum no of bends = 2

All flues must **terminate** vertically.

For further information on flue runs, please refer to section 1.10.1 and National Standards.

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

Ventilation requirements are as detailed in section 1.7

1.14 Technical Details

Tables 3 - a / b Natural Gas (G20 & G25)

Country	Approved Gas Category
FR	I_{2Er}
BE	$I_{2E(R)B}$
AT, BG, CH, CY, CZ, DK, EE, ES, FI, GB, GR, HR, IE, IT, LT, LV, NO, PT, RO, SE, SI, SK, TR	I_{2H}
LU, PL, RO	I_{2E}
NL	I_{2L}
Number of Injectors	1
Gas Connection	½ in BSP Internal Thread
Flue Nominal Bore mm (in)	125 (5)
Fan Motor Voltage	230V 1ph 50Hz

Heater Model	Heat Input kW Gross	G20/G25 Gas Flowrate m^3/hr)	G20/G25 Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
VSX20UT2M	20.0	**1.9 /** 2.2	**10.0 /** 14.8	1.7	450X4047X746	114	0.5	2501-DE
VSX25UT2M	25.0	**2.4 /** 2.8	**9.4 /** 14.1	1.9	450X4047X746	114	1.0	2507-DE
VSX30UT2M	30.0	**2.9 /** 3.3	**10.5 /** 15.2	2.0	450X4047X746	114	1.0	2507-DE
VSX30UT3M	3.0	**2.9 /** 3.3	**10.5 /** 15.2	2.0	450X5927X746	158	1.0	2507-DE
VSX35UT3M	36.0	**3.4 /** 4.0	**12.3 /** 17.4	2.3	450X5927X746	158	1.0	2507-DE
VSX40UT3M	40.0	**3.8 /** 4.4	**12.8 /** 18.0	2.4	450X5927X746	158	0.5	2560
VSX45UT3M	44.0	**4.2 /** 4.9	**11.6 /** 16.1	2.9	450X5927X746	158	0.5	2560
VSX45UT4M	44.0	**4.2 /** 4.9	**11.6 /** 16.1	2.9	450X7692X746	205	0.5	2560
VSX50UT4M	49.5	**4.7 /** 5.5	**12.8 /** 18.0	2.5L	450X7692X746	205	0.5	2560

Table 4. Flue Details

Heater Model	Mass Flow Rate of Flue Gases (kg/s)	Flue Pressure (Pa) Max Flue Resistance	Flue Gas Temp (°C)
VSX20UT	0.0116	35 - 42	190 - 250
VSX25UT	0.0132		
VSX30UT	0.0133		
VSX35UT	0.0166		
VSX40UT	0.0173		
VSX45UT	0.0196		
VSX50UT	0.0220		

2. Assembly Instructions.

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

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

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

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

2.1 Tools Required.

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

Suitable alternative tools may be used.

Trestles

Leather Faced Gloves

Pozidrive Screwdrivers

10,12 & 13mm Spanners

Tape Measure

4 & 5mm Allen Keys

2.2 Assembly Notes.

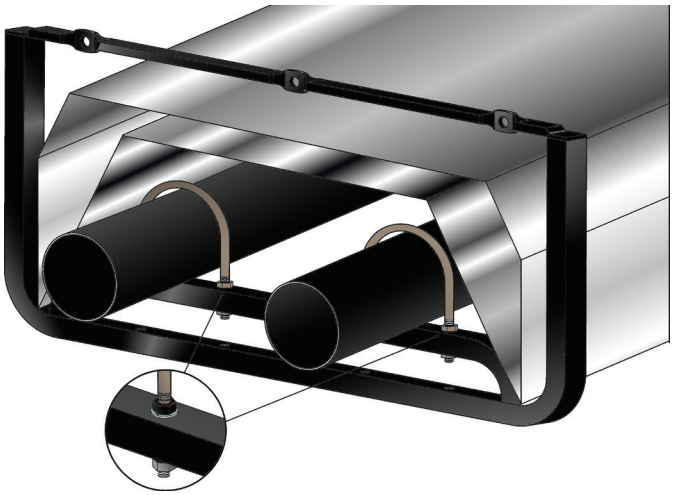
Please read these assembly notes in conjunction with the correct assembly drawings (figs 7 to 10).

2.2.1 Turbulators

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

2.2.2 Brackets

Tighten clamping 'U' bolt arrangement to tubes ONLY WHERE STATED on the assembly drawings.



2.2.4 Reflectors.

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

Remove the protective plastic coating.

2.2.5 Couplers.

Locate and position tube couplers at the end of the tubes. Ensure socket heads are facing outwards & the pre-fitted bolts in the couplers line up with the locating holes in the tubes.

Ensure the bolts are not over tightened.

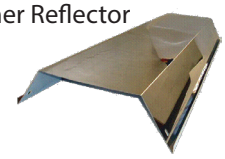
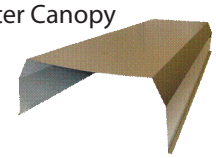
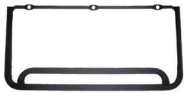
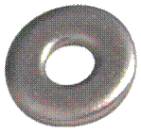
2.2.6 Burner and Heat Exchanger Assembly.

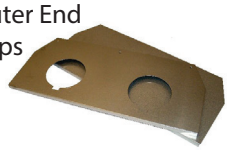
Slide the burner assembly onto the **RIGHT HAND TUBE** when viewed from above, ensuring it is fullY engaged.

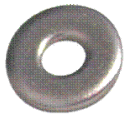
Slide heat exchanger onto the **LEFT HAND TUBE** when viewed from above, ensuring it is fully engaged. The hose connections should face vertically.

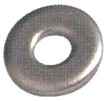
Secure both assemblies with grub screws.

2.3 Identification check list

	VSX2M 20/25/30	VSX3M 30/35/40 /45	VSX4M 45/50
Burner 	1x	1x	1x
Heat Exchanger 	1x	1x	1x
U Bend 	1x	1x	1x
Inner Reflector 	2x	3x	4x
Outer Canopy 	2x	3x	4x
Brackets 	3x	4x	5x
No.5 Torque Screw 	13x	13x	15x
M6 Mud Washer 	12x	16x	20x

	VSX2M 20/25/30	VSX3M 30/35/40 /45	VSX4M 45/50
Inner End Caps 	2x	2x	2x
Outer End Caps 	1x	1x	1x
Tubes 	2x	2x	2x
Turbulators 	2x	3x	3x
Couplers 	4x	4x	4x
M8 U Bolt 	6x	8x	10x
M8 Full Nuts 	16x	22x	28x
M4 x 10 Pozi Setpins 	7x	8x	9x

	VSX2M 20/25/30	VSX3M 30/35/40 /45	VSX4M 45/50
M6 Washer 	4x	6x	8x
M6 Full Nut 	6x	10x	14x
M6 x 35 Setpin 	4x	6x	8x

	VSX2M 20/25/30	VSX3M 30/35/40 /45	VSX4M 45/50
M4 Full Nut 	1x	2x	3x
M4 Washer 	7x	8x	9x
M6 x 15 Setpin 	2x	4x	6x

2.4 Prior to assembly

- Ensure the area in which you are working is safe and clear of obstructions.
- Identify with the components in the check list and in which order they will be assembled.
- Arrange the trestles* in a straight line to allow for length of tubes.
- Remove all protective plastic from underside of Stainless Steel Reflectors / inside of End Caps.

* if saw horses cannot be located, ensure any alternative is sound and can carry the heater weight.

Methodology: To cater for the expansion of the firing leg, all U bolts on the firing leg (except the one closest to U bend) are to be loose as described below. All reflectors, tubes, brackets and canopies are bolted together.

2.5 Step by step instructions

2.5.1 Tubes and Turbulators

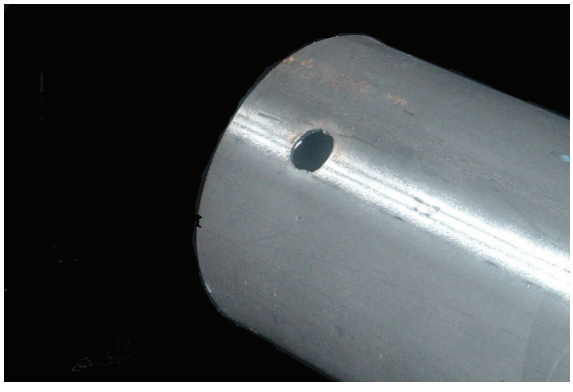
2.5.1.1 Locate and position tubes on trestles.
After deciding which end will have the burner, mark out the position of the first bracket as shown in the assembly drawings section.
Slide brackets over tubes as shown.

2x	2x	2x

2.5.1.2 VSX4M only: Locate & position the two shorter tubes and affix to tubes using couplers.
Keeping the tubes in line, tighten the couplers evenly until the tubes cannot be turned in the couplers.

0x	0x	2x

0x	0x	2x



2.5.1.3 Locate and insert turbulator(s) into tube(s) ensuring the correct length and quantity are inserted into the correct tube. See assembly drawings section for location & length.

CAUTION — SHARP EDGES!

2x	3x	3x

2.5.2 Brackets, U Bolts and U Bends

2.5.2.1 Fit the M8 U bolts over the tubes into the holes in the bracket & loosely secure with M8 nuts & washers, noting that all the brackets on the firing tube (right hand) except the bracket adjacent to the U bend should have nuts & washers on both sides of the bracket to allow bracket to be tightened whilst still allowing a 3mm gap for expansion between the tube & U bolt.
Refer to sketch below.

3x	4x	5x

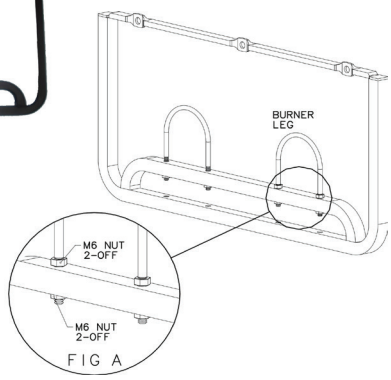
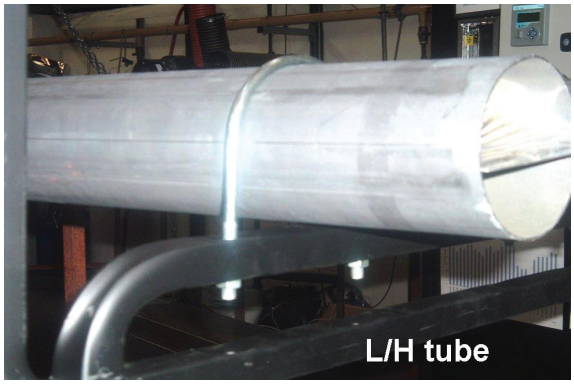
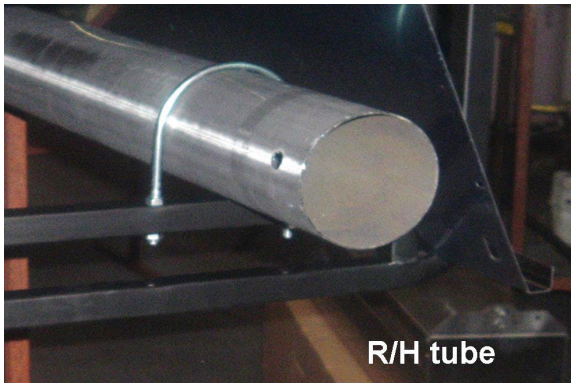


FIG A

DO NOT tighten any of the nuts at this stage

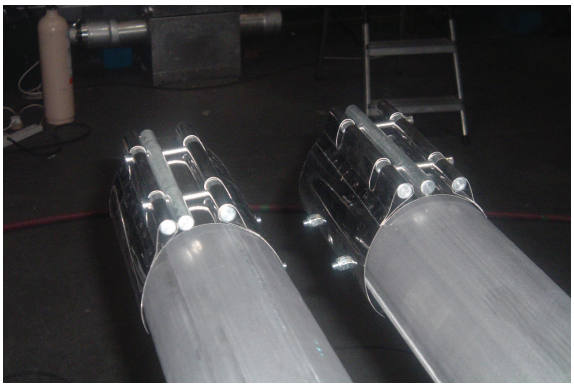




2.5.2.2 Working at the opposite ends of the tubes to the burner, locate & position two couplers so that the socket heads are facing outwards & the pre-fitted bolts in the couplers line up with the locating holes in the tubes.

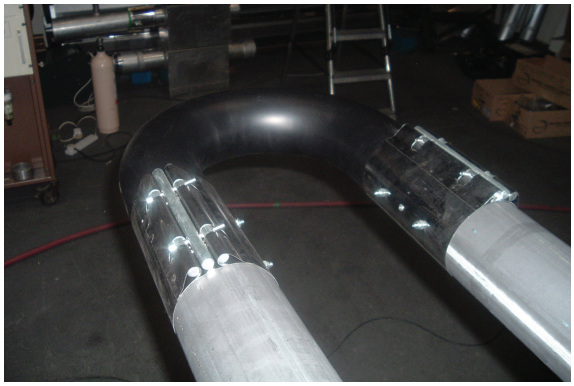
DO NOT tighten any of the nuts at this stage

2x	2x	2x



2.5.2.3 Slide U bend into the open end of the couplers ensuring the pre-fitted bolts engage in the pre-cut holes in the U tube section. Tighten all four clamping bolts to provide a tight grip between tubes & U tube section.

1x	1x	1x



2.5.3 Reflectors

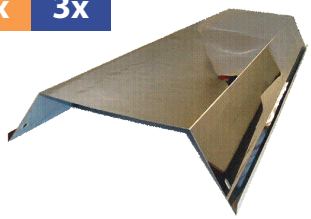
Remove protective film before starting.

Reflectors are supplied pre-punched and are universal throughout the VSX series.

2.5.3.1 Starting at the burner end, slide the reflectors through the brackets until they are all roughly in position along the heater, referring to the assembly diagram showing overlaps.
Measure the distance between the end of the burner end tubes & the centre of the end bracket, **this should be 6" (150mm)**, slide bracket along tubes to adjust, then tighten U bolts on the end bracket.

CAUTION — SHARP EDGES!

2x **3x** **3x**

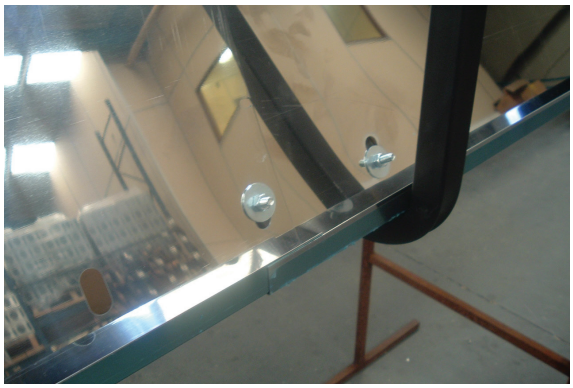


2.5.3.2 Slide end reflector so that the innermost slotted holes line up with 1st bracket fixing holes, then fix in place using M6 x 35mm pins, washers & nuts.

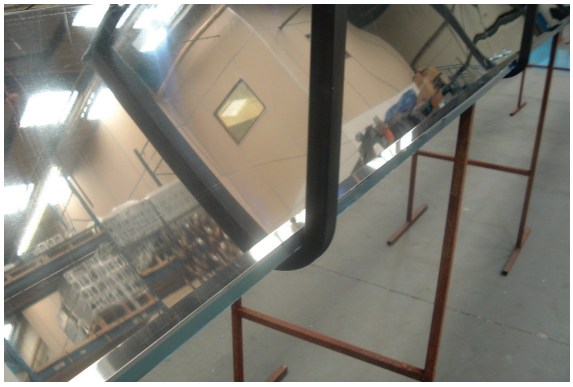
2x **2x** **2x**

2.5.3.3 Slide 2nd bracket to line up with innermost slotted hole in 1st reflector, & bolt together using M6 x 35mm pins, washers & nuts.
Bolt 1st & 2nd reflectors together using end elongated holes in each.
Refer to notes 'W', 'X', 'Y' and Z in fig.12 for further details.

4x **4x** **4x**

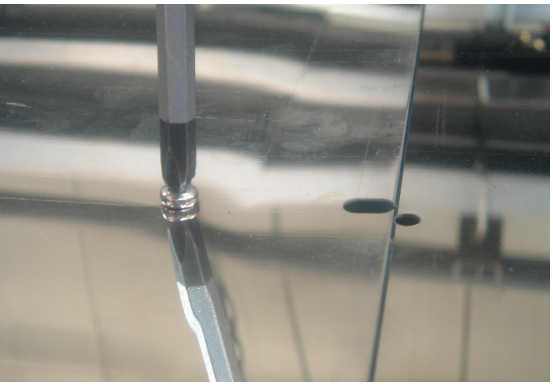


2.5.3.4 Repeat this procedure referring to the assembly diagram for quantities used on specific models, but noting that the final bracket is not bolted to the reflector. (See photo)



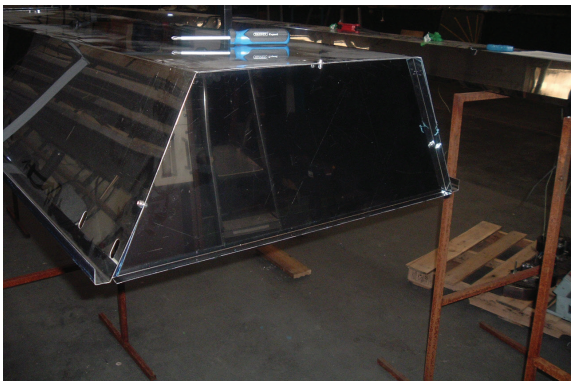
At this stage all the U bolts should be fully tightened.

2.5.3.5 Locate M4 pins, washers & nuts into holes in overlapping reflectors as shown.



1x 2x 3x

2.5.4 End Caps

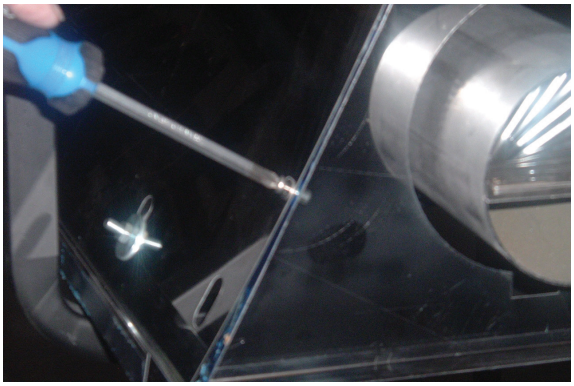


2.5.4.1 Using M4 setpins & washers fix the blank end cap beneath the reflector profile at the U bend end with the **flanges facing outwards.**

3x 3x 3x

2x 2x 2x

2.5.4.2 Using M4 setpins & washers fix the 'cut out' end cap beneath the reflector profile at the burner end with the **flanges facing outwards**



3x 3x 3x

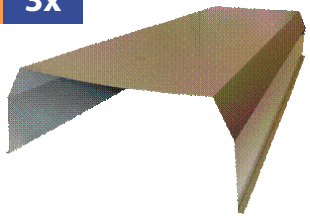
2.5.5 Canopies

Remove protective film before starting.

2.5.5.1 Slide the outer canopies over the reflectors from the U bend end ensuring correct location in reflector profile. Line up burner end canopy flush with burner end reflector. Overlap canopies as shown in the assembly diagram.

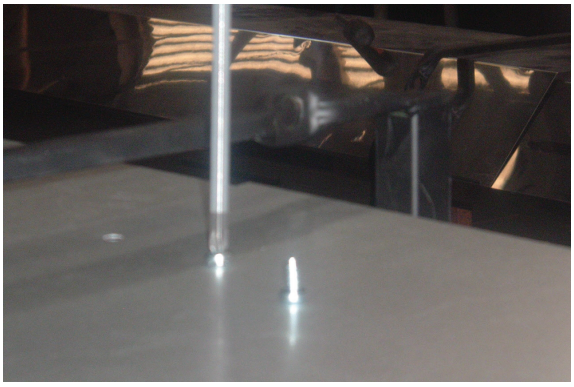
CAUTION — SHARP EDGES!

1x 2x 3x



2.5.5.2 Adjust canopies so that the holes on top align with each other as detailed in the assembly instructions.
Locate and fix one No.5 torque screw on every canopy overlap.

1x 2x 3x



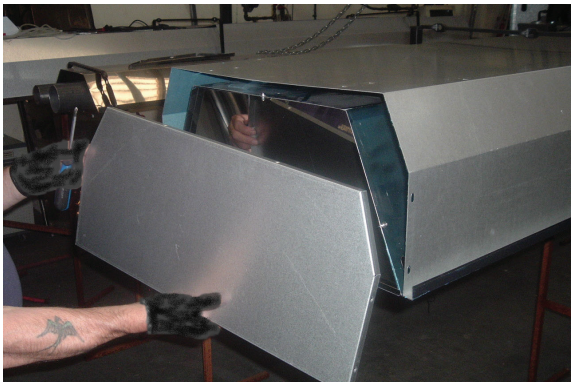
2.5.6 Canopy End Caps

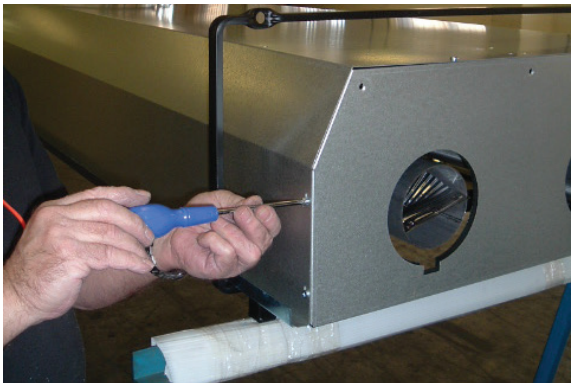
Locate 6 off No.5 torque screws.
Position the blank canopy end cap with the end cap flanges **facing inwards**, beneath the canopy profile at the U bend end & fix with screws.
Repeat procedure for 'cut-out' canopy end cap, again ensuring the flange faces **inwards**.

CAUTION — SHARP EDGES!

2x 2x 2x

2x 2x 2x





2.5.7 General

The heater assembly is now complete and can now be installed.
We would recommend that the burner and heat exchanger be assembled once the heater has been installed in the roof space.

1x 1x 1x

1x 1x 1x

2.6 Detailed Assembly Drawings

The following pages show the technical dimensional details of the VSX heaters.

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

Refer to figure 10 for details of **'W', 'X', 'Y' and 'Z'** fastening and locations.

fig.7. VSX2M 20/25/30

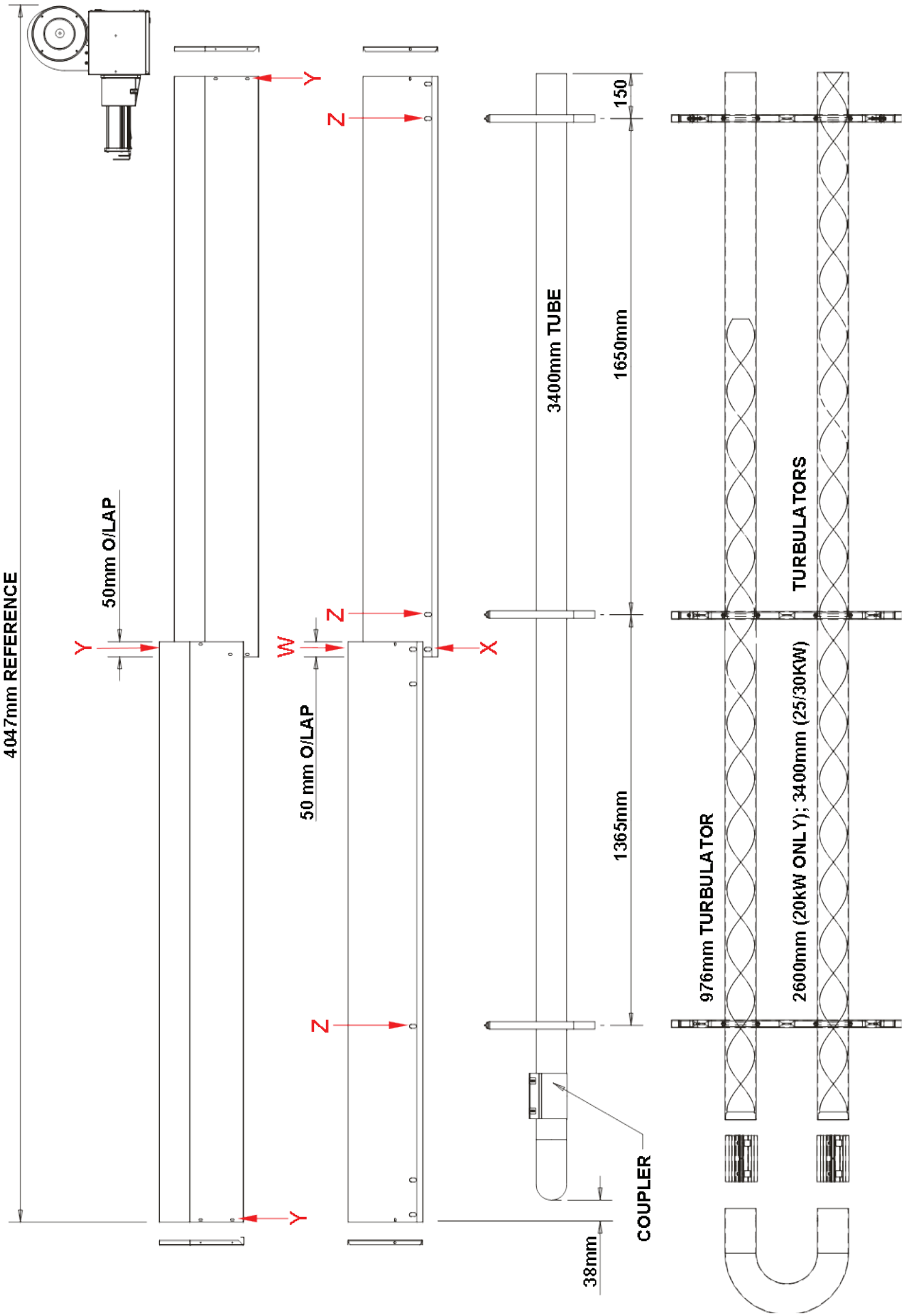


fig.8. VSX3M 30/35/40/45

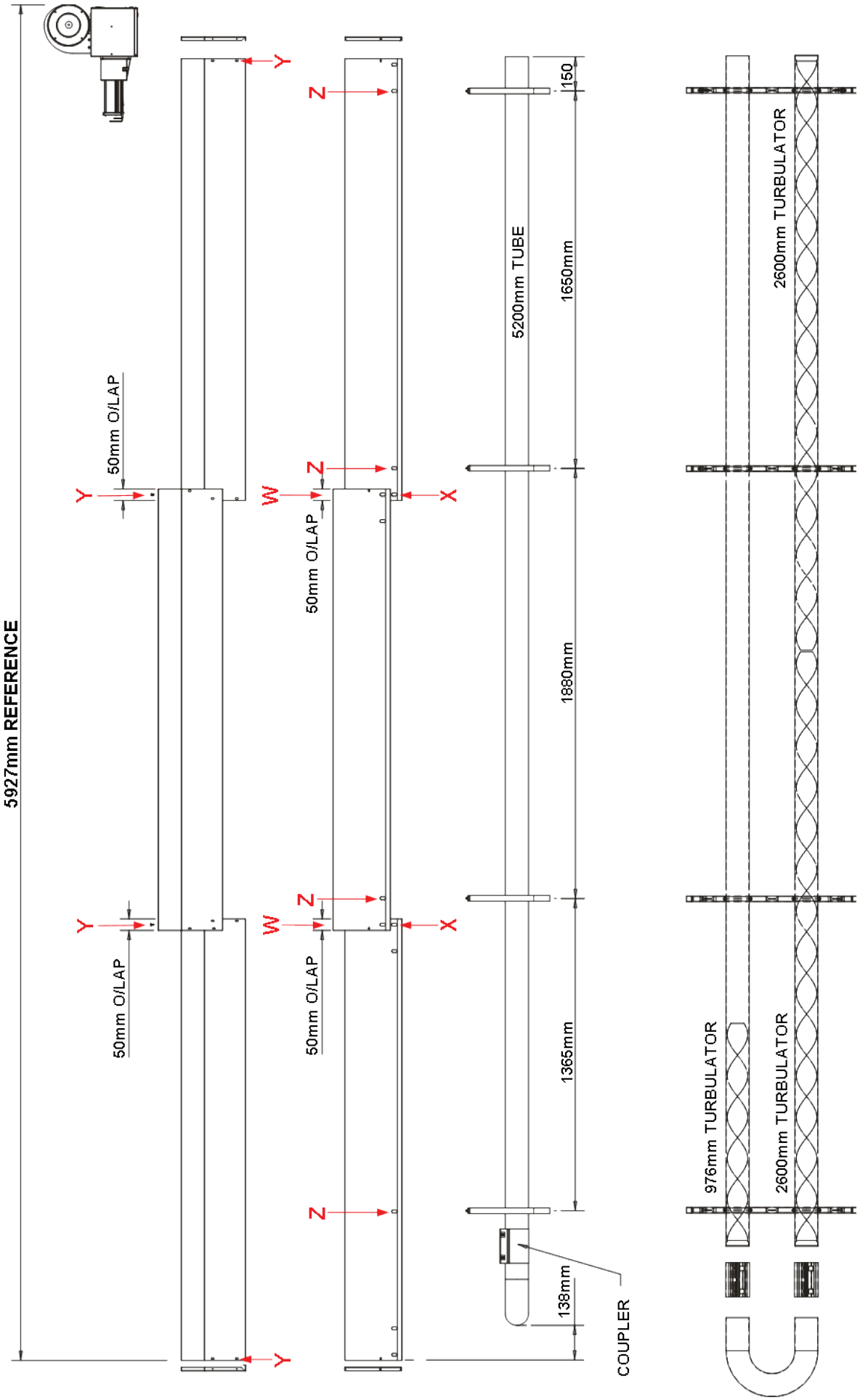


fig.9. VSX4M 45/50

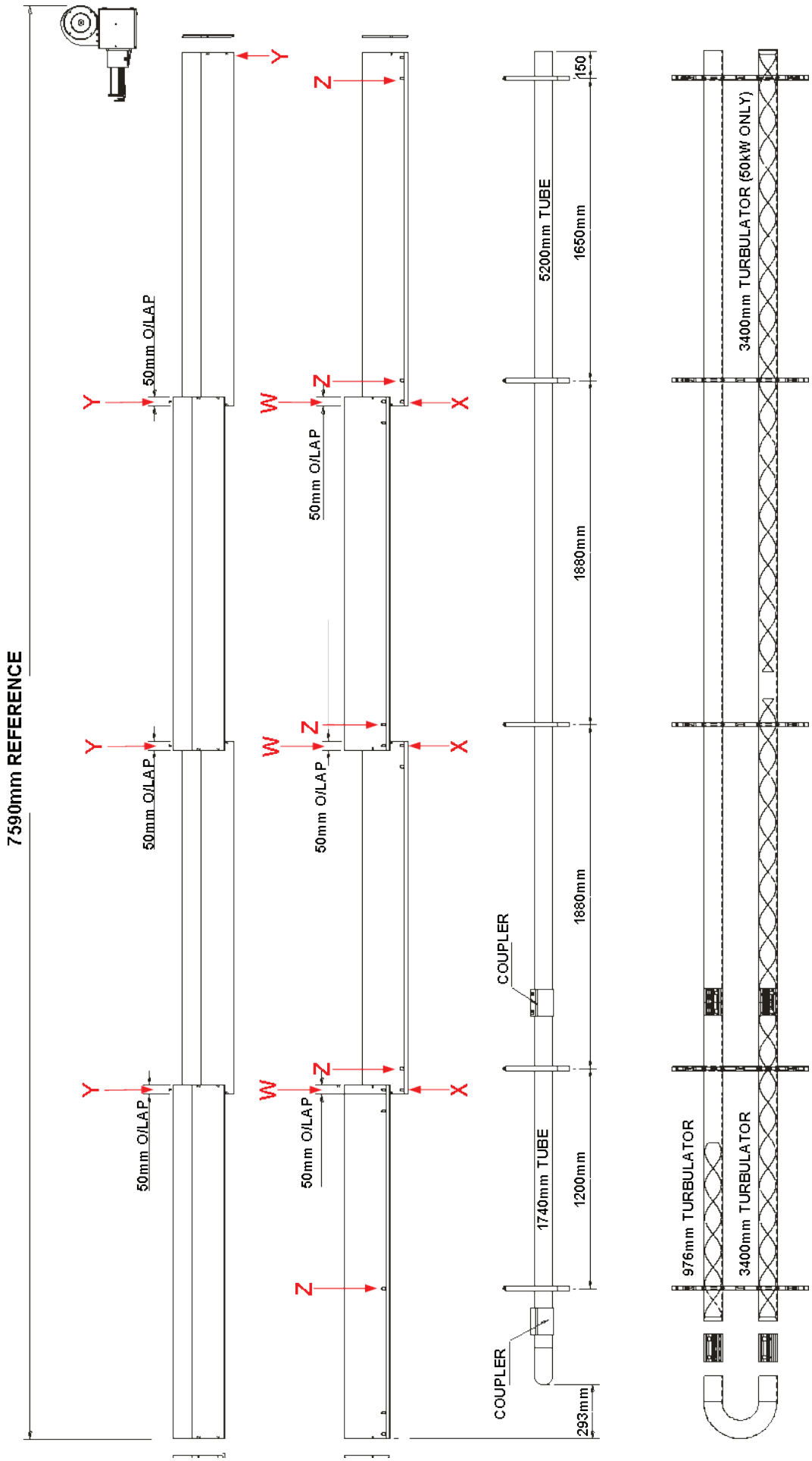
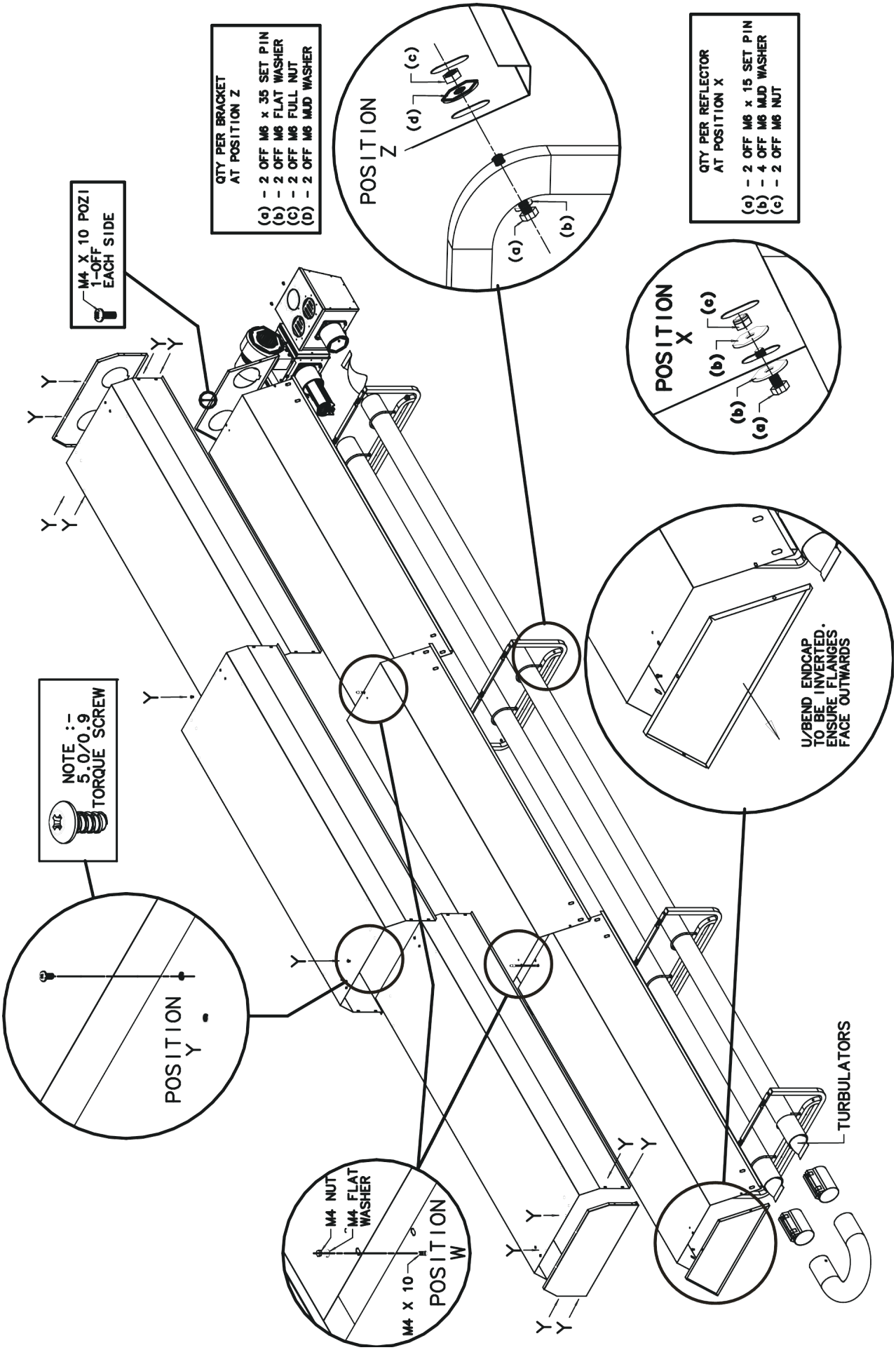
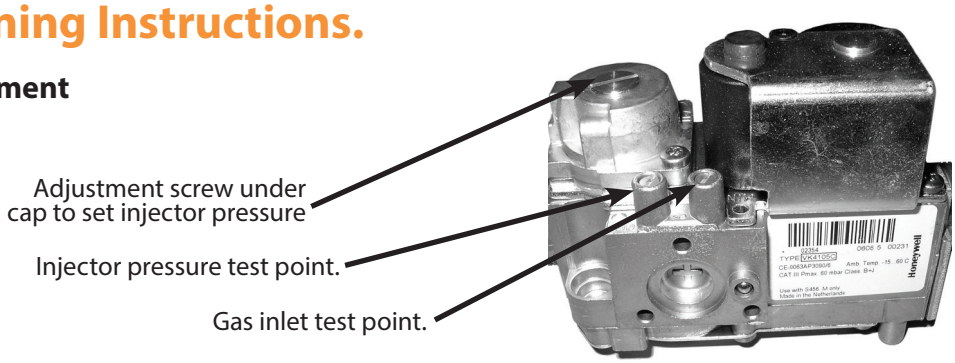


Figure 10. VSX Heater Breakdown (3 module shown)



3. Commissioning Instructions.

3.1 Gas Valve Adjustment



3.2 Commissioning chart for the VSX series unitary heaters

Check installation has been carried out to these instructions.

Ensure gas and electricity supplies are isolated.

Disconnect gas hose from burner

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

Replace burner on tube and secure.

Reconnect gas hose. Open isolating valve. Check soundness.

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

Close control housing

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

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

The heater should now run through its start up sequence and ignite.
If the heater fails to light first time, the sequence controller will try a further two atempts.

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

NO

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

Has the burner lit?

YES

Check gas pressure.

Check operation on flame failure. Check gas pressure drive.

Check operation of air pressure switch.

Close control housing

Leave the instructions with a responsible person.

4. Servicing Instructions

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

4.1 Tools Required.

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

Suitable alternative tools may be used.

Leather Faced Gloves

Pozidrive Screwdrivers

Small Flat Head Screwdrivers

4mm Allen Keys

Adjustable Spanners

Manometer

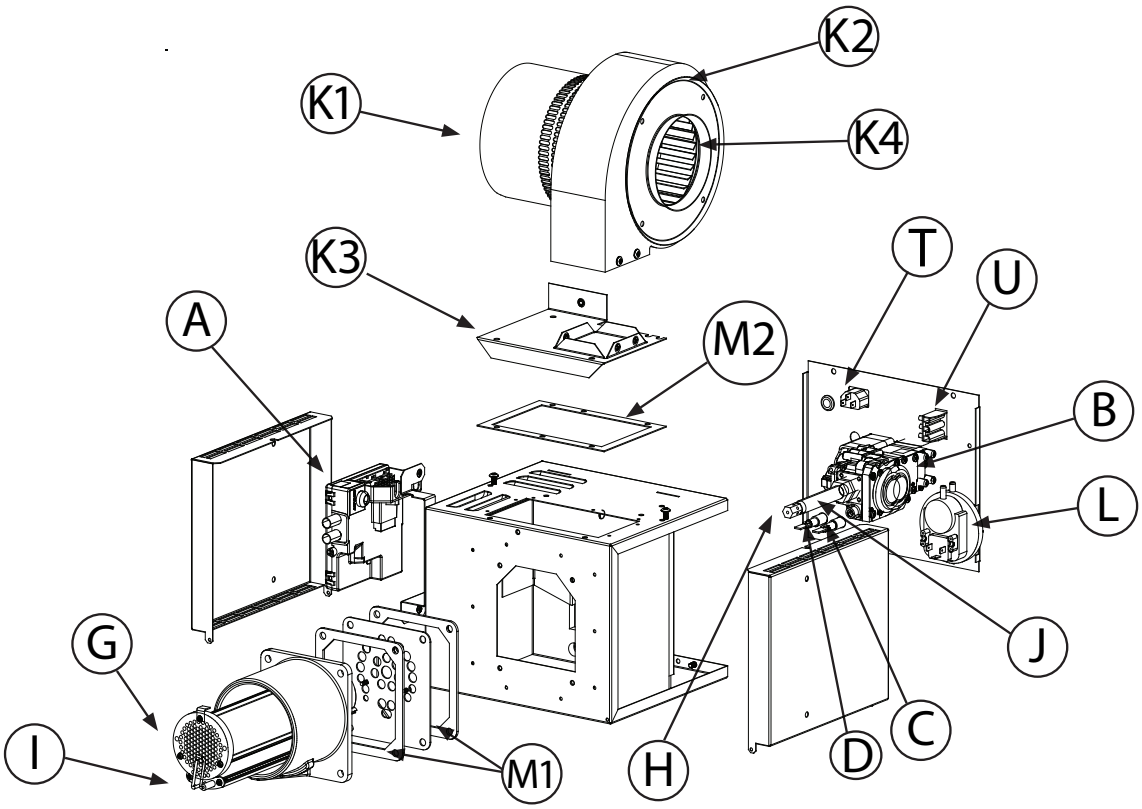
Wrench with 13mm Socket

10,12 & 13mm Spanners

Soft Brush

4.2 Burner Description.

fig. 11. Forced Gas Burner

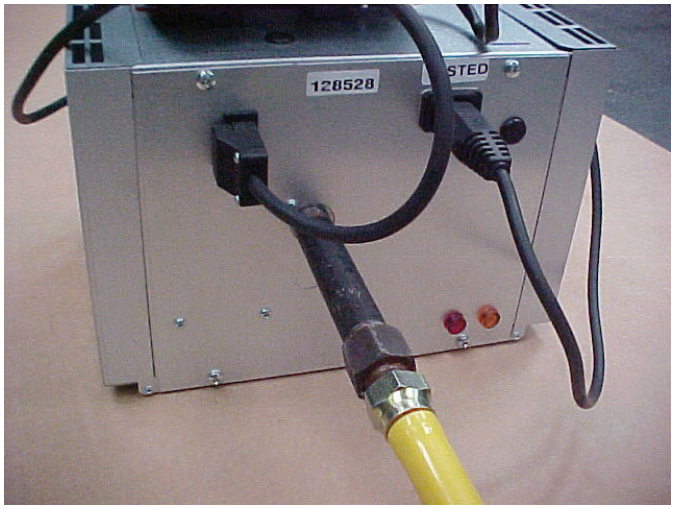


A	Ignition Controller	**J**	Injector Carrier	**L**	Pressure Switch
B	Gas Valve	**K1**	Fan	**M1**	Burner Gaskets
C	Power On Red Lamp	**K2**	Fan Orifice Plate	**M2**	Fan Gasket
D	Burner On Amber Lamp	**K3**	Fan Fixing Plate	**U**	Fan Socket
I	Igniter with Lead	**K4**	Air Hose Spigot	**T**	Power Input Socket

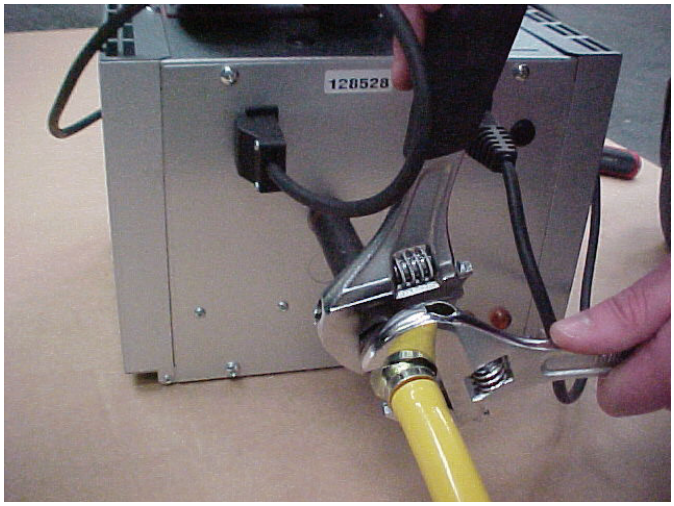
4.3 Burner Removal

Step 1 Isolate power and gas supplies.

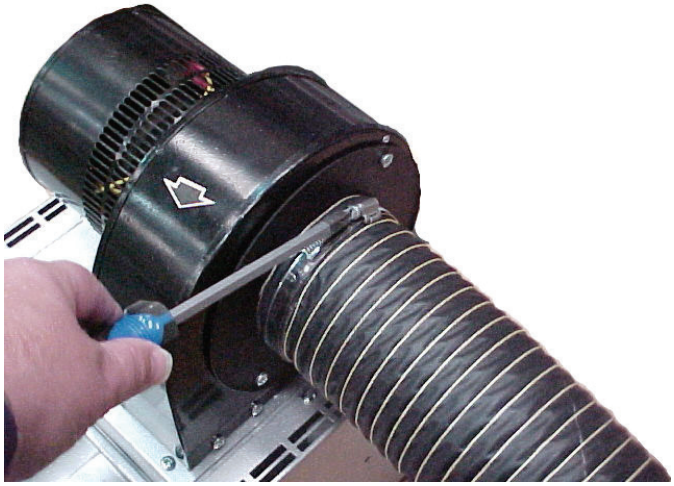
Step 2 Unplug the power connectors.



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



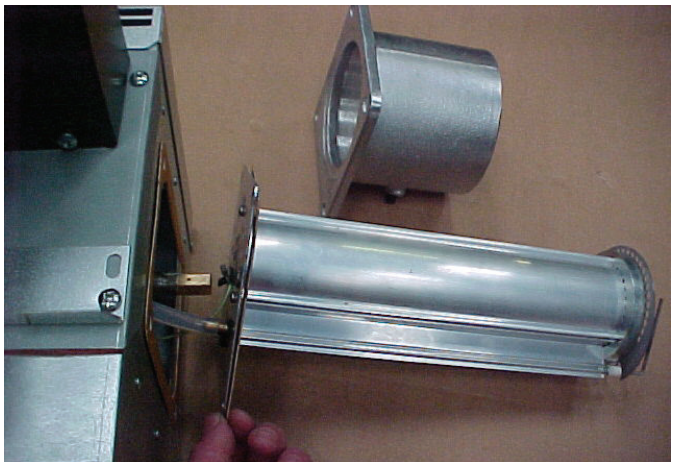
Step 4 slacken the jubilee clip attaching the pre-heated air hose to the burner fan and remove.



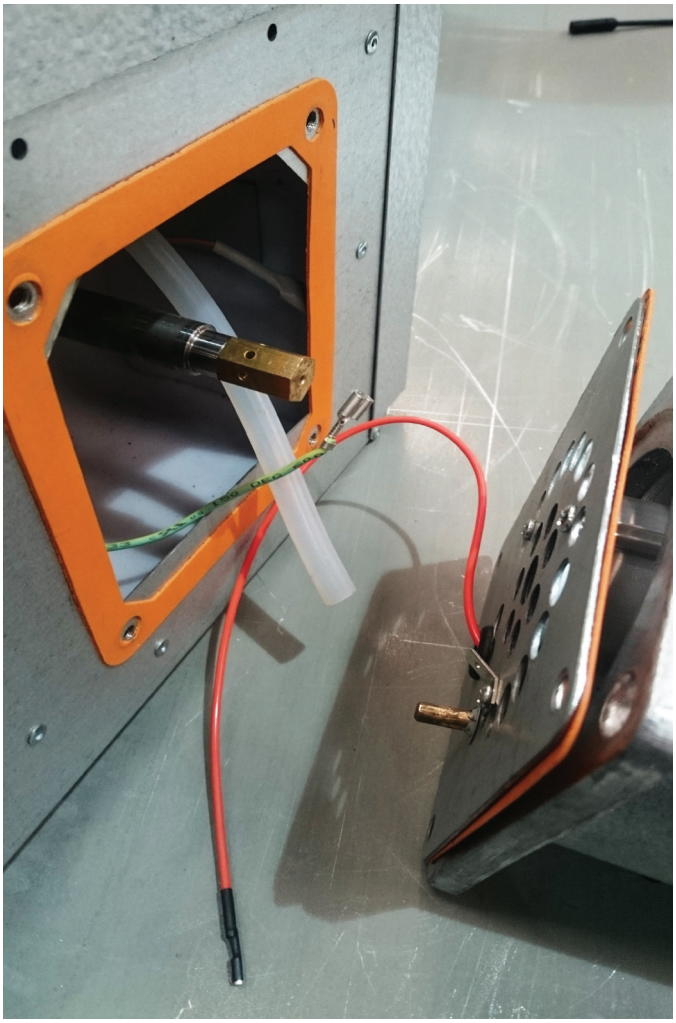
Step 5 Slacken the set screw on the burner support casting. Remove the burner from the radiant tube and position the burner in a safe area to prevent the burner or components attached to the burner from falling to the ground.

4.4 Burner Gas Injector Servicing

Step 1 Remove the burner support casting and gasket.

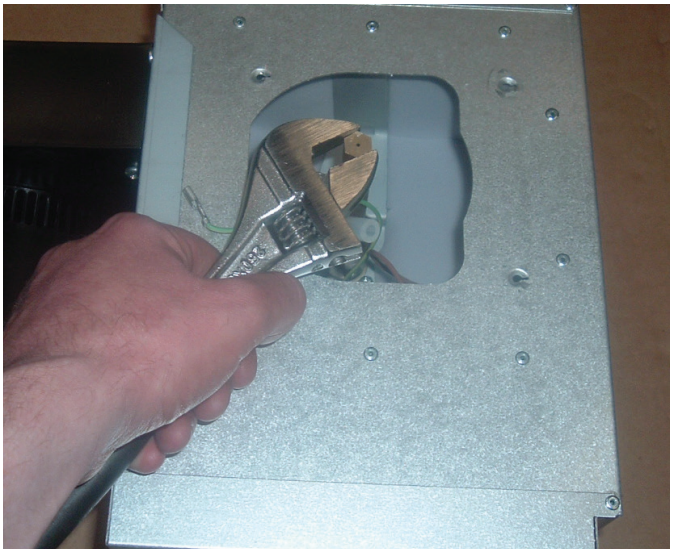


Step 2 The burner head assembly can be removed by firstly disconnecting the silicon tube from the pressure test point, the earth cable and withdrawing the probe lead once disconnected the from the controller.



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

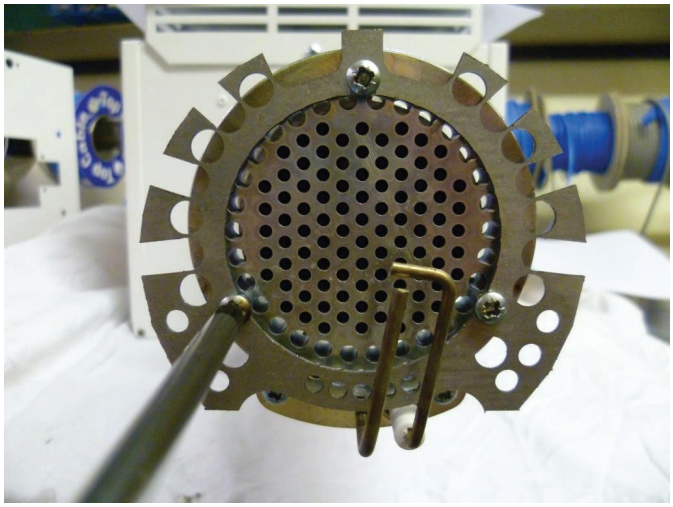
⚠ When replacing the gas injector ensure approved thread sealant is used.



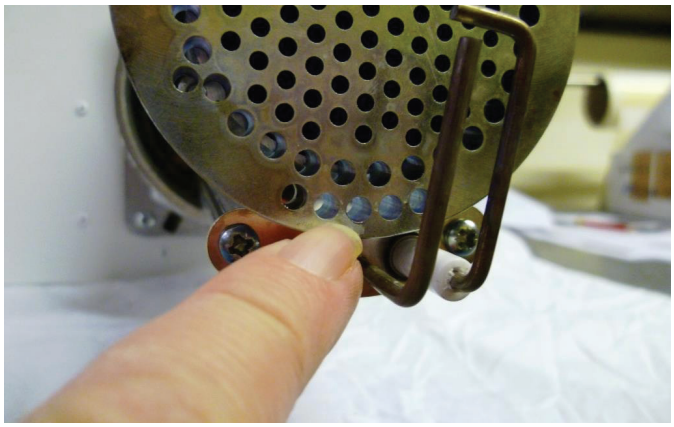
Step 4 Reconnect ignition leads and silicone tube to test nipple. Refit gasket and support casting.

4.5 Burner Head and Electrode Servicing

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



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



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

Step 4 Detach the electrode assembly from the burner head by removing the two screws and disconnecting the ignition lead from the controller.

Step 5 Refit the electrode assembly n the reverse order, making sure to thread the ignition lead through the grommets in the burner orifice plate and burner box.

Step 6 Check the positions and spark gap as shown in fig.12

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

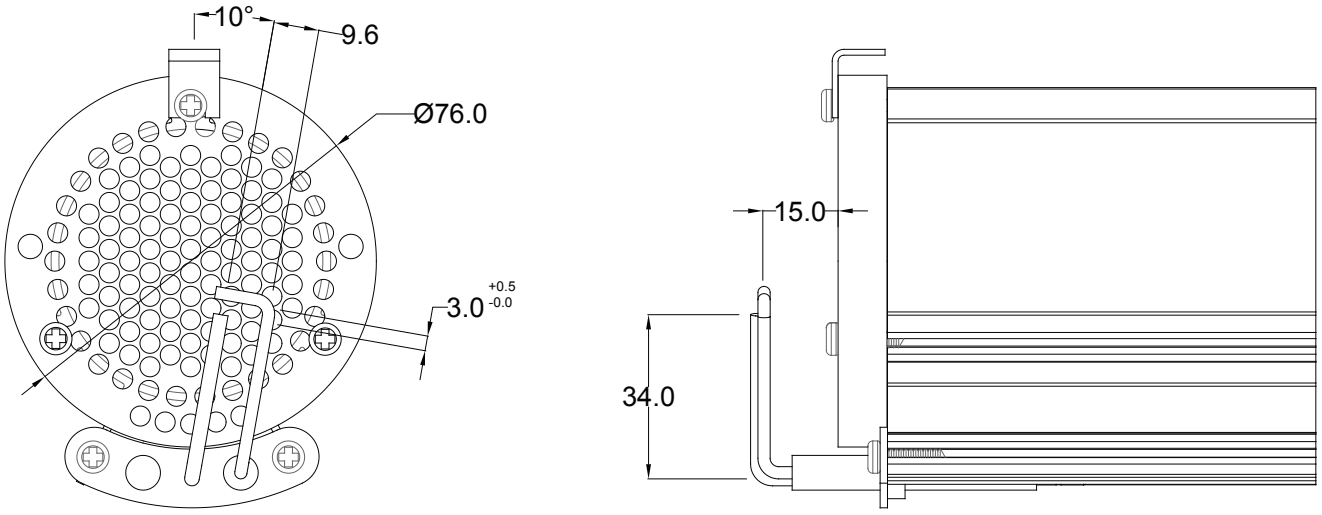


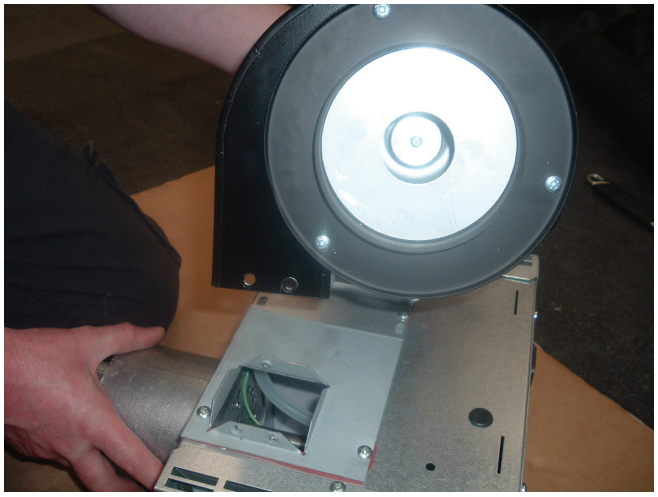
fig. 12. Burner Head Detail

4.6 Combustion Fan Assembly Forced Burner

Step 1 Slacken jubilee clip and remove the flexible hose from the fan.

Step 2 Remove fan screws and unplug from burner box.

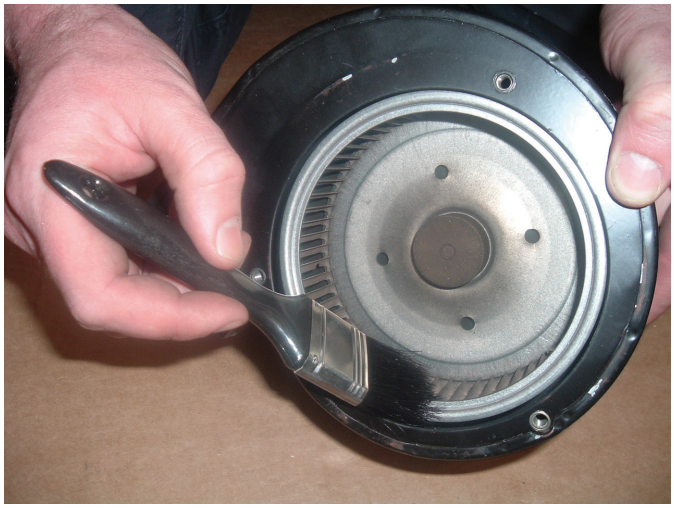
Step 3 The combustion fan can now be detached.



Step 4 Remove the fan orifice plate and spigot.

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

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



Step 7 Ensure the impeller rotates freely.

Step 8 Refit components.

4.7 Radiant Tube Servicing

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

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

Step 3 Remove the U bend.

Step 4 Withdraw the turbulators from the appliance. Carefully noting their condition and position.

Replace turbulators if necessary.

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

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

Step 7 Refit components.

4.8 Heat Exchanger Servicing

Step 1 Remove the flue connections

Step 2 Slacken casing support screws and remove heat exchanger from the radiant tube.

Step 3 Remove any dust and dirt from the heat exchanger & refit.

4.9 Reflector Servicing

The condition of the reflectors should be noted. If necessary the reflectors can be cleaned with a mild detergent.

This can significantly improve the efficiency of the appliance.

4.10 Inspection of Flue

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

4.11 Re-commissioning After Service

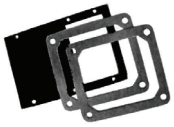
After servicing of the heater has been undertaken, it will be necessary to re-commission the heater as detailed in Section 3 of these instructions.

5. Spare Parts.

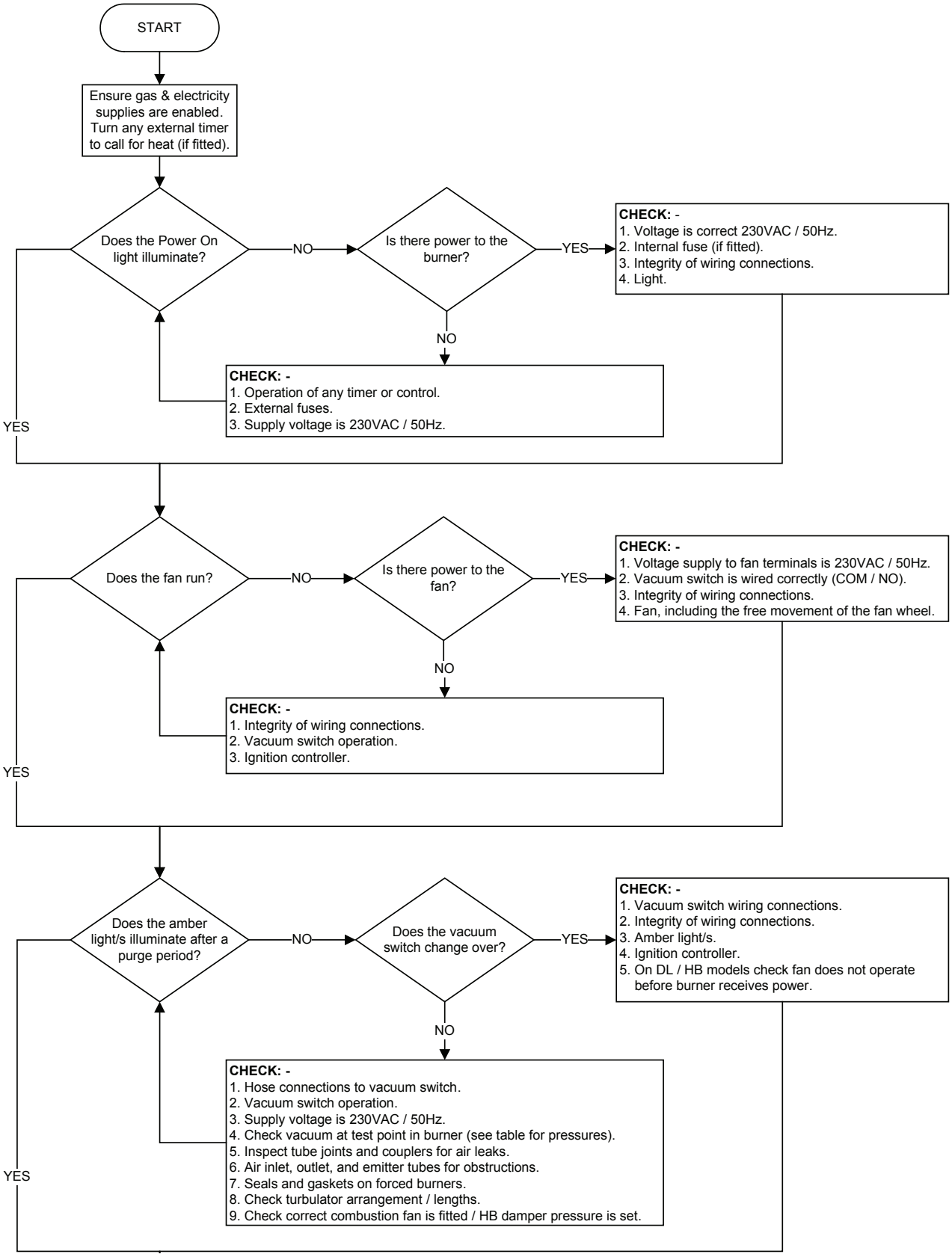
Required Spares. In order to aid troubleshooting and servicing we recommend that the components shown in this section should be stocked.

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

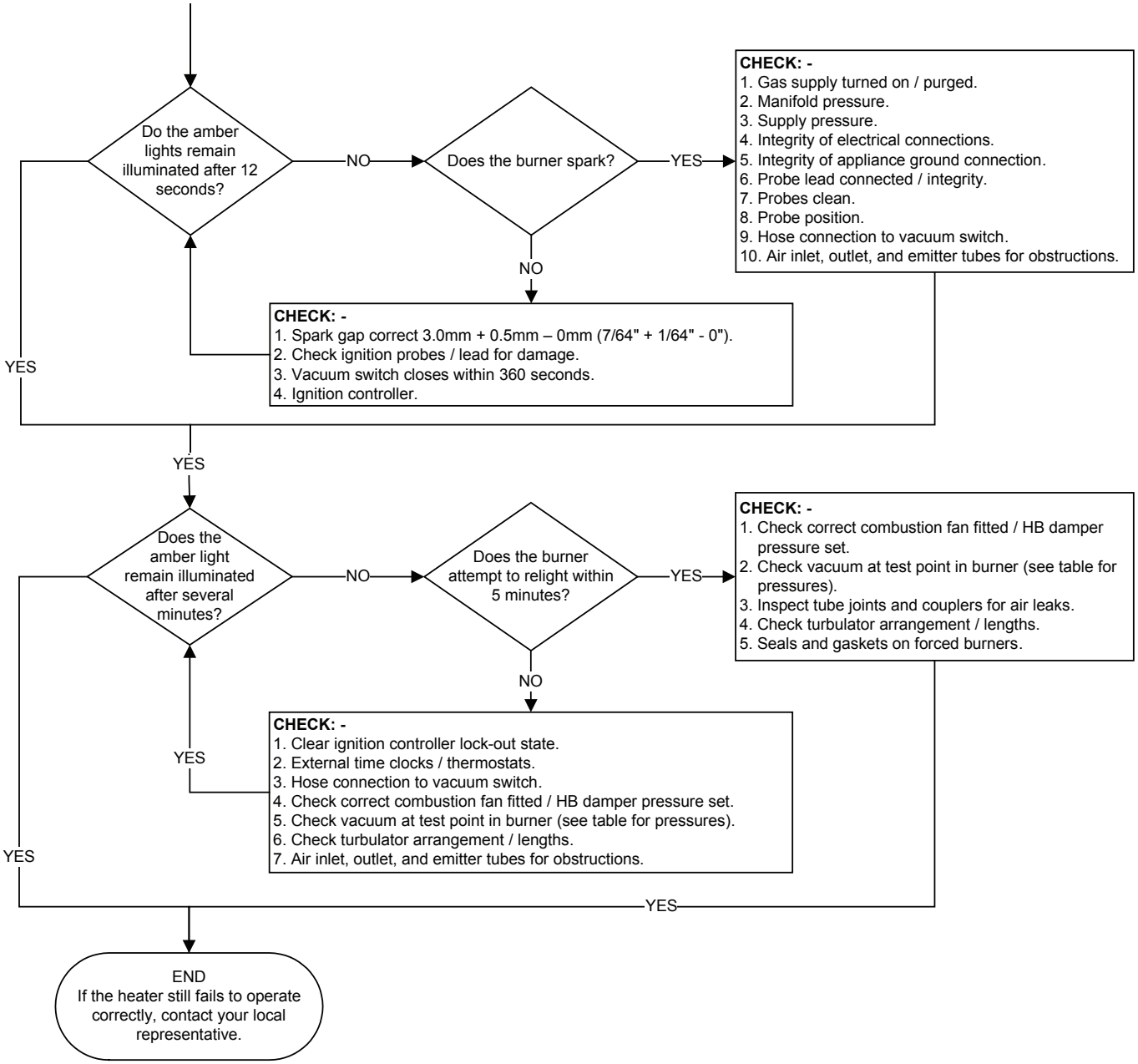
Item	Description	Part No.
	Control Box	202776
	Nat Gas Valve 220/240V	202658
	Mains Inlet Socket	900523
	Mains Input Cable	2125
	Fan Socket	3123-5
	Vacuum Test Nipple	L104200
	Igniter Assembly	202531-2
	Jet Carrier (all except VSX50N) VSX50N	200420 201630
	Injector	see section 1.11

Item	Description	Part No.
	Combustion Fan	see section 1.11
	Pressure Switch	201676
	Amber Neon (Burner On)	2175
	Red Neon (Mains On)	2180
	Gasket Set	201488
	Flame Plate (VSX20/25 ONLY)	201358
	Cables: Burner Harness Earth Lead (grn/yel)	 900574 900225-1

6. Fault Finding Guide.



Continued on next page

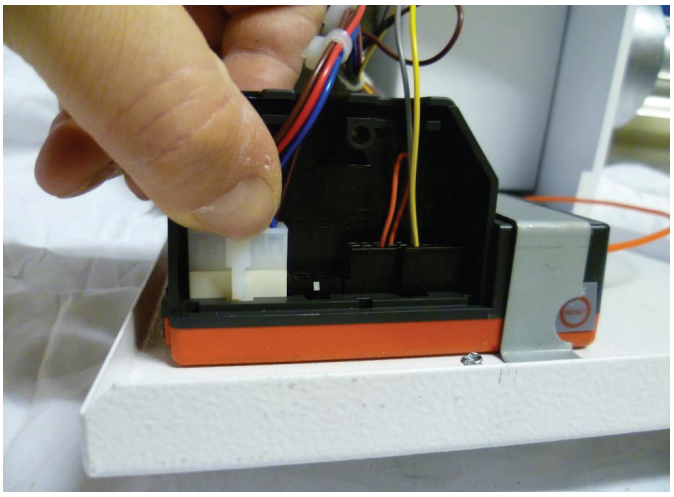

Do the amber lights remain illuminated after 12 seconds?
NO
Does the burner spark?
YES
CHECK: -
1. Gas supply turned on / purged.
2. Manifold pressure.
3. Supply pressure.
4. Integrity of electrical connections.
5. Integrity of appliance ground connection.
6. Probe lead connected / integrity.
7. Probes clean.
8. Probe position.
9. Hose connection to vacuum switch.
10. Air inlet, outlet, and emitter tubes for obstructions.
NO
CHECK: -
1. Spark gap correct 3.0mm + 0.5mm – 0mm (7/64" + 1/64" - 0").
2. Check ignition probes / lead for damage.
3. Vacuum switch closes within 360 seconds.
4. Ignition controller.
YES
YES
Does the amber light remain illuminated after several minutes?
NO
Does the burner attempt to relight within 5 minutes?
YES
CHECK: -
1. Check correct combustion fan fitted / HB damper pressure set.
2. Check vacuum at test point in burner (see table for pressures).
3. Inspect tube joints and couplers for air leaks.
4. Check turbulator arrangement / lengths.
5. Seals and gaskets on forced burners.
NO
CHECK: -
1. Clear ignition controller lock-out state.
2. External time clocks / thermostats.
3. Hose connection to vacuum switch.
4. Check correct combustion fan fitted / HB damper pressure set.
5. Check vacuum at test point in burner (see table for pressures).
6. Check turbulator arrangement / lengths.
7. Air inlet, outlet, and emitter tubes for obstructions.
YES
YES
YES
END
If the heater still fails to operate correctly, contact your local representative.

7. Replacement Parts.

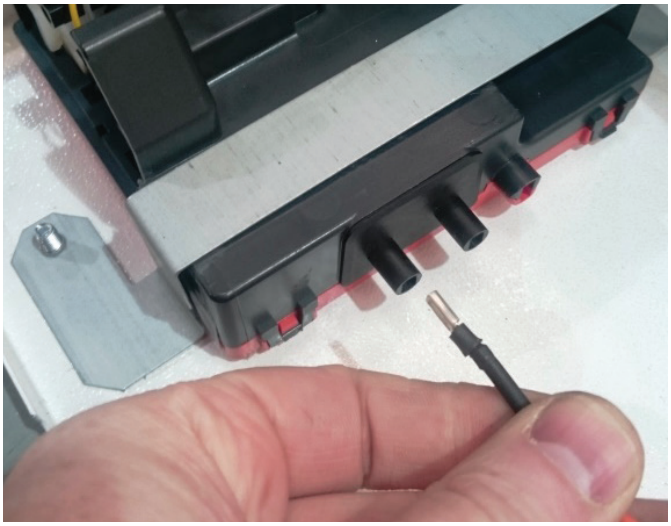
7.1 Burner Controller Replacement

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

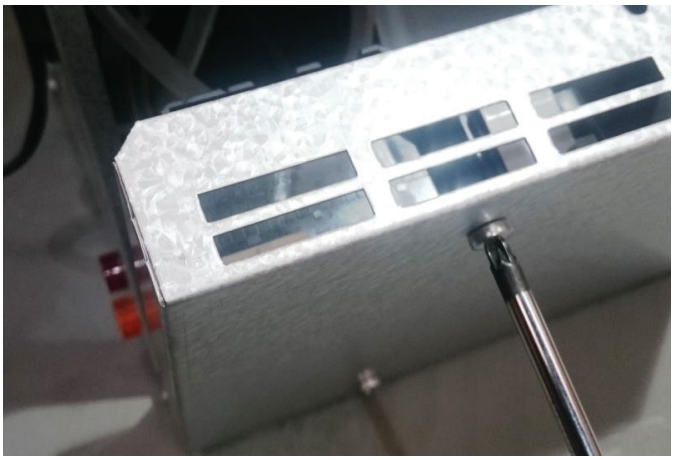
Step 2 Disconnect wiring harness from the burner controller



Step 3 Disconnect the HT Lead from burner controller.



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



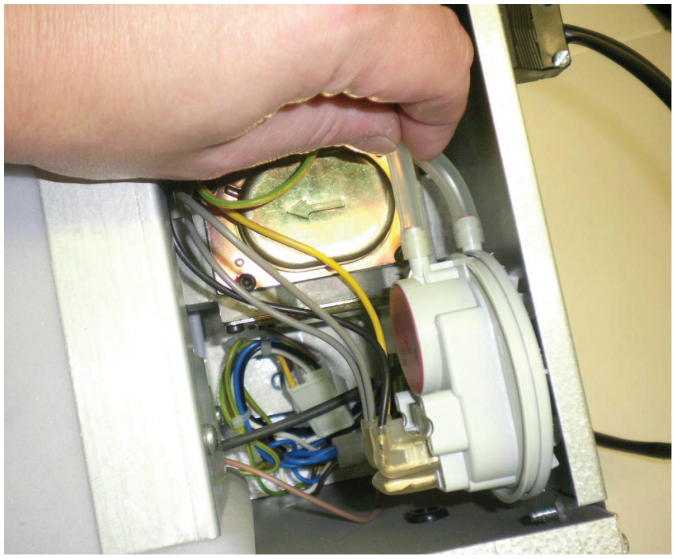
Step 5 Fit new burner controller.

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

Step 7 Test product and close access door.

7.2 Air Pressure Switch Replacement

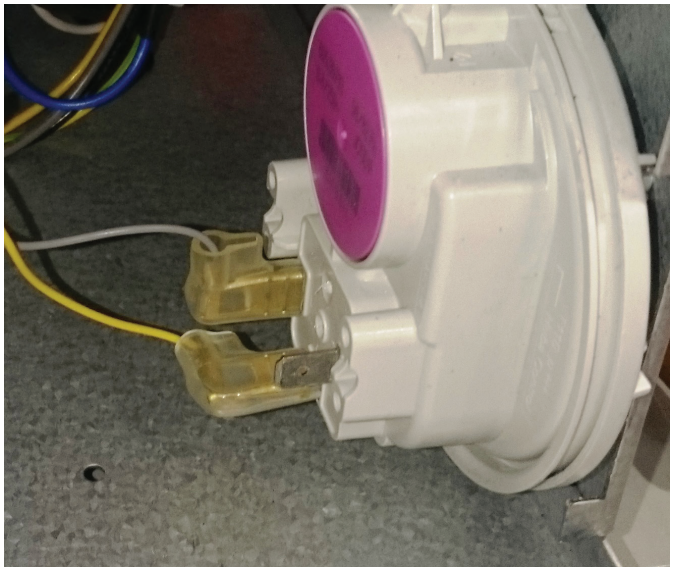
Step 1 Disconnect the two silicone impulse tubes.



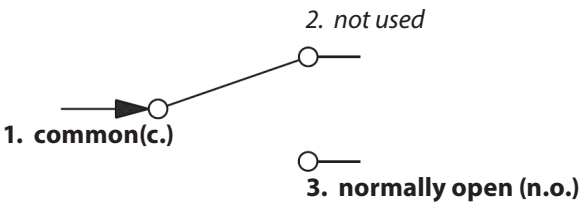
Step 2 Remove the two screws as shown below.

Step 3 The air pressure switch can now be removed.

Step 4 Fit the new air pressure switch ensuring the impulse tubes and cables are connected corredctly as shown in next photo.



GREY CABLE to pressure switch - **common (c.)**
YELLOW CABLE to pressure switch - **normally open (n.o.)**

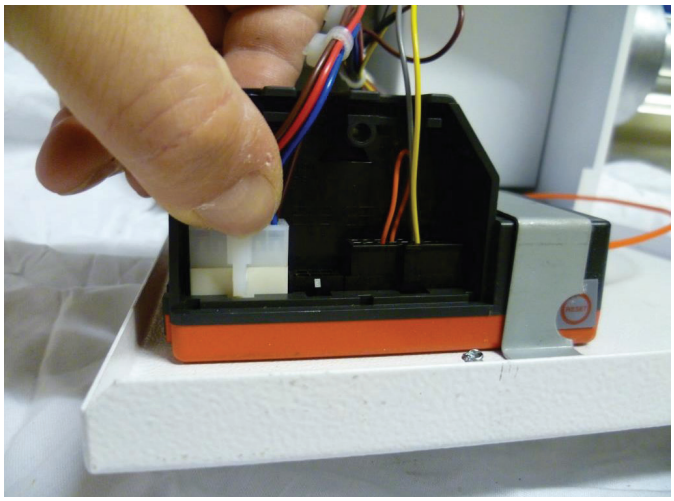


Step 5 Test product and close access doors.

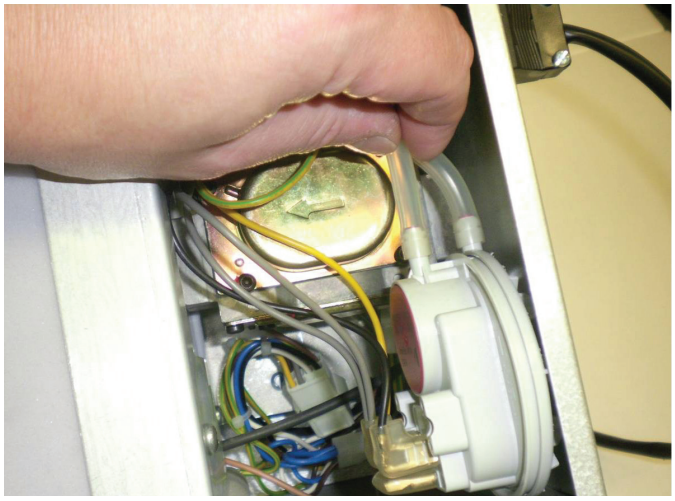
7.3 Gas Valve Replacement

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

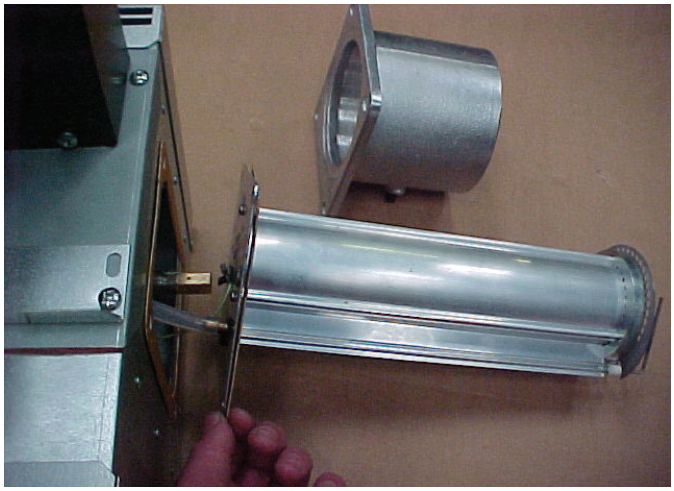
Step 2 Open the right hand access door and detach the wiring harness and HT lead from controller.



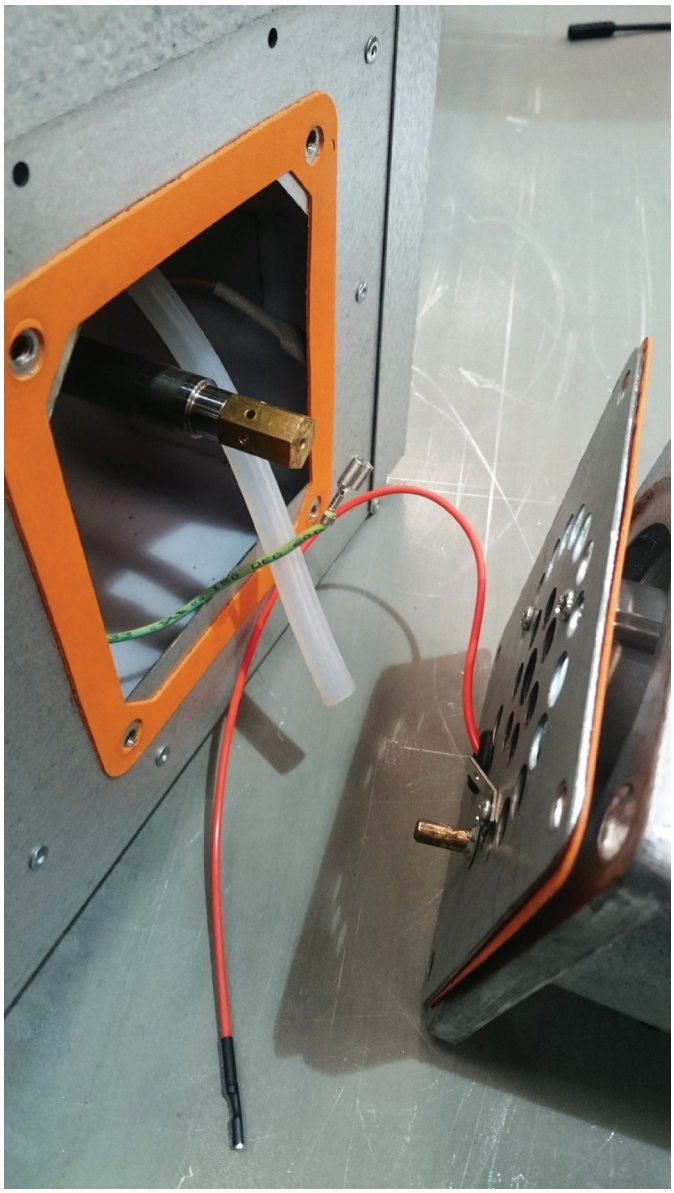
Step 3 Open the left hand access door and detach the impulse hoses from the air pressure switch.



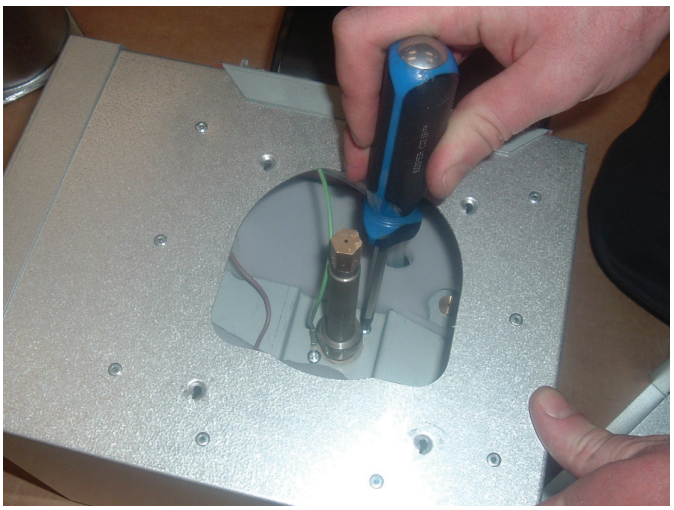
Step 4 Remove the 4 screws holding the burner head onto the burner assembly and carefully pull burner head assembly from housing.



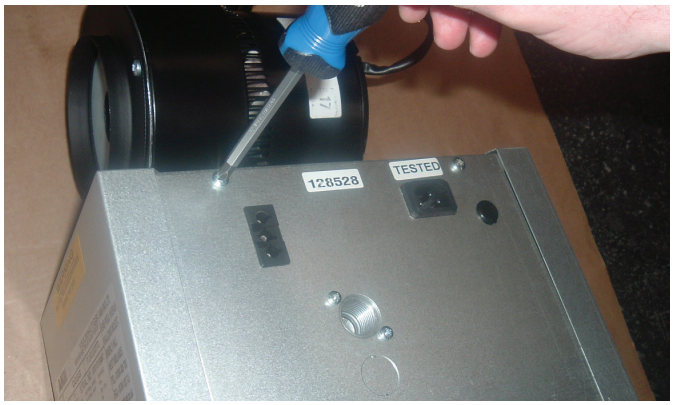
Step 5 The burner head assembly can be removed by firstly disconnecting the silicon tube from the pressure test point, the earth cable and withdrawing the ignition lead once disconnected the from the controller.



Step 6 From within the combustion chamber, remove the two screws holding the front of the gas valve.



Step 7 Turning the housing over, remove the four screws holding the rear burner plate in position.



Step 8 Open the two side doors and remove the rear plate assembly.

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

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

Step 11 The gas valve can now be replaced.

Step 12 Refit all components in reverse order.

Step 13 Set gas pressures to data badge or as per section 1.11 and ensure reliable burner performance.

Step 14 Test product and close access doors.

7.4 Generation Codes

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

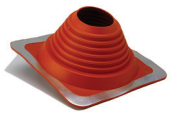
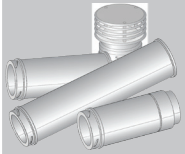
The generation code is displayed on the product label thus:

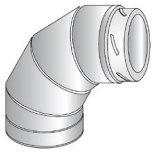
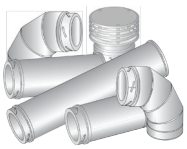
Generation code BB:

Honeywell gas valve and ESYS 2068 ignition controller

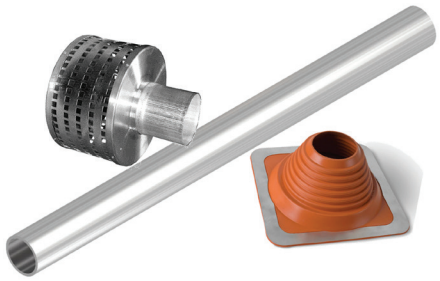
This instruction manual is only for use with Generation code BB.

8. Ancillaries

Item	Description	Part No.
	½" BSP Gas Valve	6506
	½" BSP Gas Flex 600mm 1000mm	 6500 6500-2
	Galv Suspension Chain 10m length 90m length	 6515 6516
	Speedlinks (8/pack)	6524-SUB
	Galv D Shackle	6518
	Turnbuckle Assembly	C766300-SUB
	Rubberised Roof Plate c/w Fixing Kit	33-51-222
	Flue Kit type A 1 x 7156, 1 x 7157, 1 x 7158, 1 x 7162 & 1 x 33-51-222	TWFK-5A

Item	Description	Part No.
	Heat Exchanger Flue Adaptor	201889
	Heat Exchanger Fresh Air Adaptor	VSF-DA
	Flue Outlet Shroud	201301
	Straight Flue 914mm length	7156
	Straight Flue 1524mm length	7157
	Adj Straight Flue 450mm length	7158
	Gas Vent Terminal/ Cowl	7162
	Adjustable Elbow 0-90°	7166
	Flue Kit type B as type A kit PLUS 2 x 7166	TWFK-5B

ANCILLARY

Item	Description/ Part No.
	Fresh Air Intake Kit **Part no. FAFK-4**

SPARES

Item	Description	Part No.
	Bends 45° 90°	 7075 7076
	Coupler	7095
	Extra 3M Flue	7070-SUB

UK Reference Regulations

Health & Safety at Work Act 1974

IEE Wiring Regulations (BS 7671)

BS 6896 Specification for installation and maintenance of gas-fired overhead radiant heaters for industrial and commercial heating (2nd and 3rd family gases)

BS5440 Part 1 Flueing and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases). Specification for installation of gas appliances to chimneys and for maintenance of chimneys

Notes

9. User & Operating Instructions.

9.1 To Start the Heater

1. Ensure gas supply is turned on.

2. Electrical supply to the controls is on.

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

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

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

5. After a pre-purge period of 20 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 (details below).

9.2. To Switch Off Heater

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

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

9.3. Routine Maintenance between Service Intervals

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

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

9.4 Frequency of Servicing

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

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

For Service requirements, please contact your local representative (details below).

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

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