AMBIRAD

AMBIRAD VISION® VSXE

RADIANT TUBE HEATERS

INSTALLATION INSTRUCTION MANUAL



INDEX **Section**

Introduction, Document Index & Tools Required

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WARNINGS

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

Part No. 700012

CE

Nortek Global HVAC (UK) Limited, Fens Pool Avenue, Brierley Hill, West Midlands, DY5 1QA

Introduction.

Welcome to the new range of high efficiency AmbiRad Vision radiant tube heaters. Local regulations may vary in the country of use and it is the installers responsibility to ensure that such regulations are satisfied.

All installation, assembly, commissioning and service procedures must be carried out by suitable qualified competent persons appropriate to the statutory regulations in the country of use.

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

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

All Dimensions shown are in mm unless otherwise stated.

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

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Tools required.

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

Suitable alternative tools may be used.


Trestles


Leather Faced Gloves


Pozidrive Screwdriver


10mm, 12mm & 13mm Spanners


Wrench with Extension


13mm Socket


Tape Measure


4 & 5mm Allen Keys

1. Installation Requirements.

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

1.1 Health and Safety

AmbiRad heaters must be installed in accordance with the relevant provisions of the Gas Safety (Installations and Use) Regulations 1998. Due account should also be taken of any obligations arising from the Health and Safety at Works Act 1974 or relevant codes of practice. In addition the installation must be carried out in accordance with the current IEE wiring regulations (BS 7671), BS 6896 (Industrial & Commercial) and any other relevant British

Standards and Codes of Practice by a qualified installer. Isolate all electrical supplies to the heater & controller before proceeding.

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

1.2 Model Definitions

VSXE = AmbiRad Vision High efficiency U Tube heater with forced burner, heat exchanger, stainless steel reflector and end caps.

1.3 Heater Suspension

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

These methods are illustrated in Figure 1.b. If there are any doubts as to the strength or suitability of roof steelwork to which heaters are to be suspended, please refer to a Consultant, Architect or owner of the building. The recommended mounting heights for AmbiRad heaters are given in the following table.

Model	Recommended Mounting Height (m)	
kW	Horizontal	Inclined / wall mounted
20	5.5 - 8.0	4.5 - 6.0
25	6.0 - 9.0	5.0 - 6.0
30	6.5 - 10.0	5.0 - 7.0
35	7.0 - 11.0	5.5 - 7.5
40	7.5 - 12.0	6.0 - 8.0
45	8.0 - 13.0	6.5 - 9.0
50	8.5 - 14.0	7.0 - 10.0

1.4 Wall Mounting

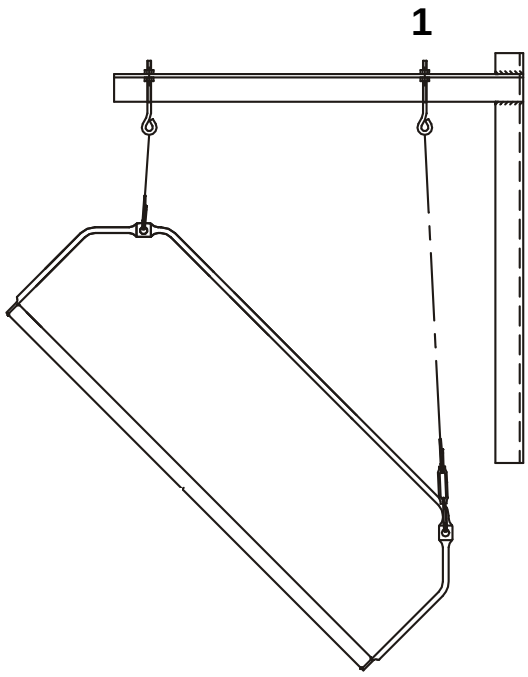
These radiant tube heaters can be wall mounted using the appropriate bracket (AmbiRad part no WMB-13-22-38).

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

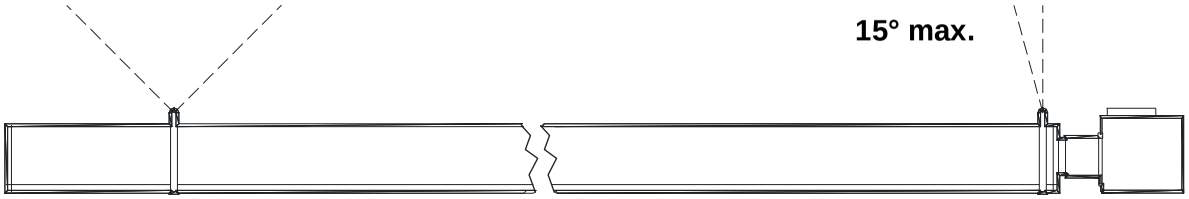
Table 1 Angle Mounting

		U Tube	
Heater Size	Required angle	Chain length	Eyebolt position
20 - 50	**30-35°**	12 links	1
	45°	16 links	1

Figure 1.a. Angle Mounting using the Wall mounting bracket

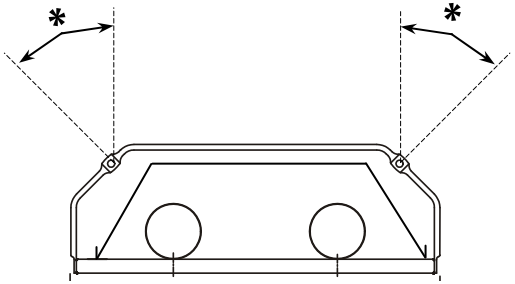


Where chain supports have an angle of inclination greater than 15° an equal and opposite support is recommended.



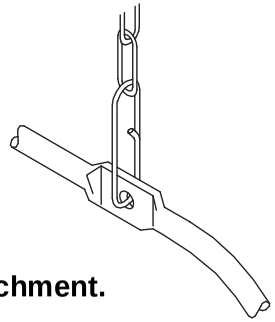
Vertical suspension chain ideal. Where supports are inclined, maximum recommended angle of inclination is 15°.

Vertical or inclined suspension on this plane is acceptable.

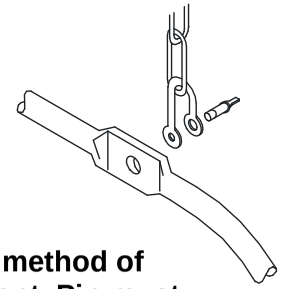


These angles to be equal and not more than 45°.

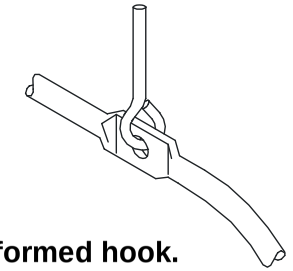
ON U TUBE VARIANTS THE HEATER SHOULD SLOPE DOWNWARDS TOWARDS THE RETURN BEND AND ON LINEAR VARIANTS SHOULD SLOPE DOWNWARDS TOWARDS BURNER BY APPROX. 10mm FOR BOTH HORIZONTAL AND WALL MOUNTED INSTALLATIONS.



Typical Speedlink attachment.



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



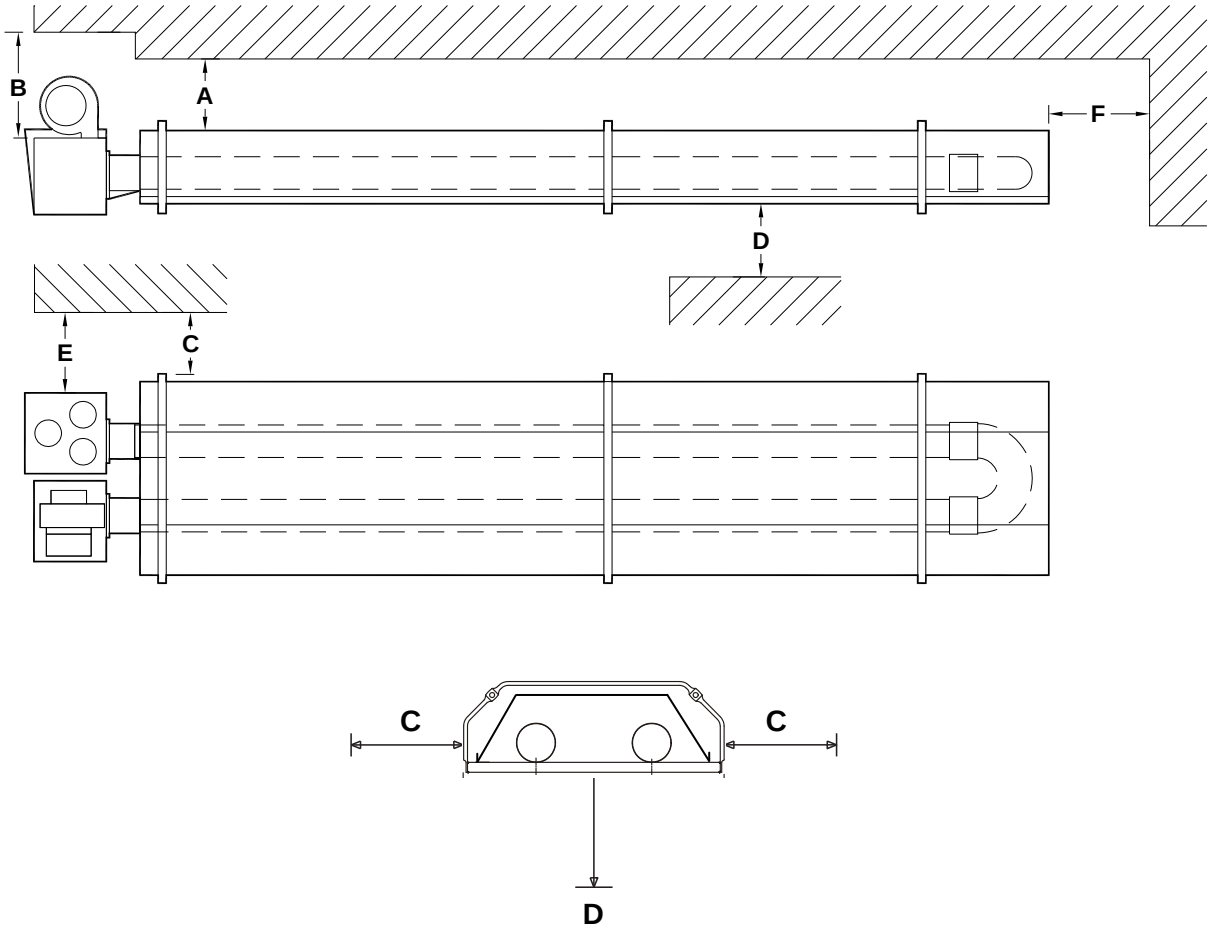
Drop rod with formed hook. note. hook or eyebolt must be closed tight.

Figure 1.b. Recommended Methods of Heater Suspension.

1.5 Clearance to Combustibles.

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

Figure 2 Diagram illustrating the clearance to combustibles



VSXEUT		20/25/30	35/40	50
Above Reflector	**A**	180	180	180
Above Burner / Heater Outlet	**B**	500	500	500
To the Sides	**C**	1300	1300	1300
Below Tubes	**D**	2300	2500	2500
Horizontally from Heat Exchanger outlet (UNFLUED)	**E**	1200	1200	1200
End Wall	**F**	700	700	700

1.6 Gas Connection and Supply

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

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

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

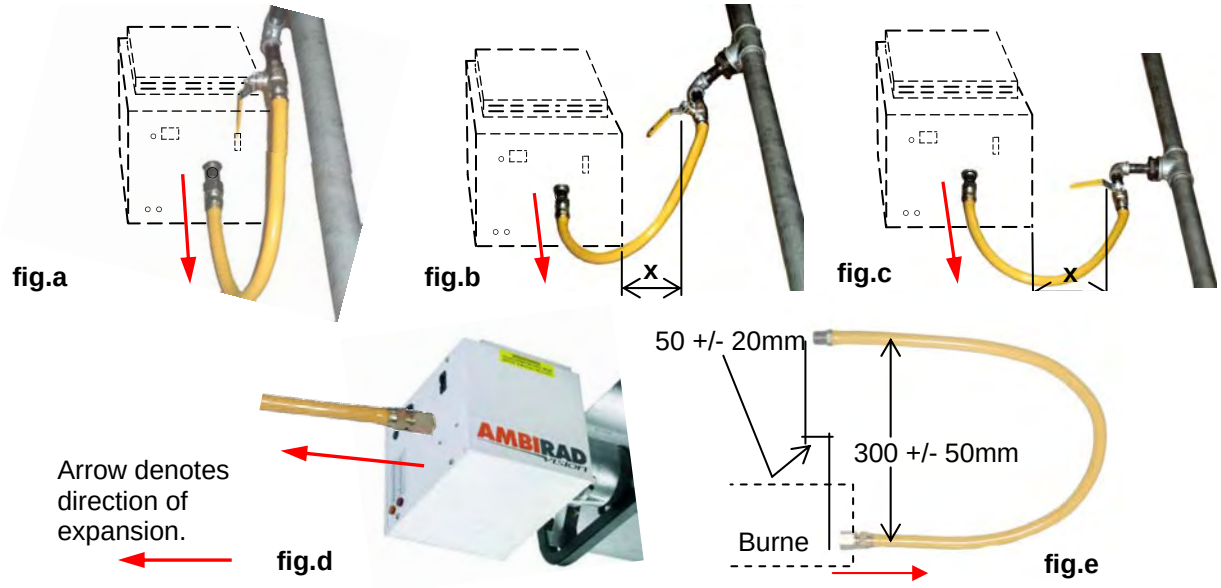
Take care when making a gas connection to the heater not to apply excessive turning force to the internal controls.

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

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

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

Figure 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.

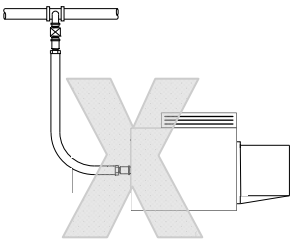


fig.f

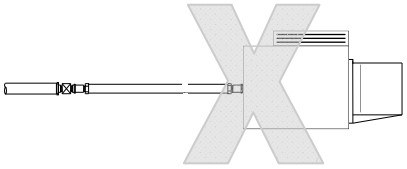


fig.g

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	**I2H**
Gas Type	Natural Gas (G20)
Max Supply Pressure (mbar)	25
Min Supply Pressure (mbar)	17
Nominal Pressure (mbar)	20
Gas Supply	Connection R½ ½in BSP Internal Thread

1.7 Electrical Connection

This appliance must be earthed.

Supply 230V 50Hz single phase.

Standard heater 116W.

Current rating 0.55 amp max (inductive).

Fuse: external 3 amp.

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

The flexible supply cables should be of 0.5mm² and comply with BS 6500. The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow Earth;
Blue Neutral;
Brown Live

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

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

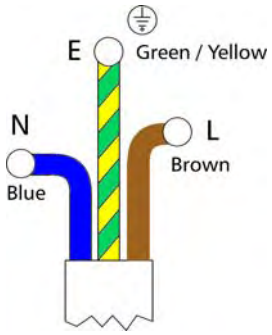


Figure 4.a Single Phase Wiring

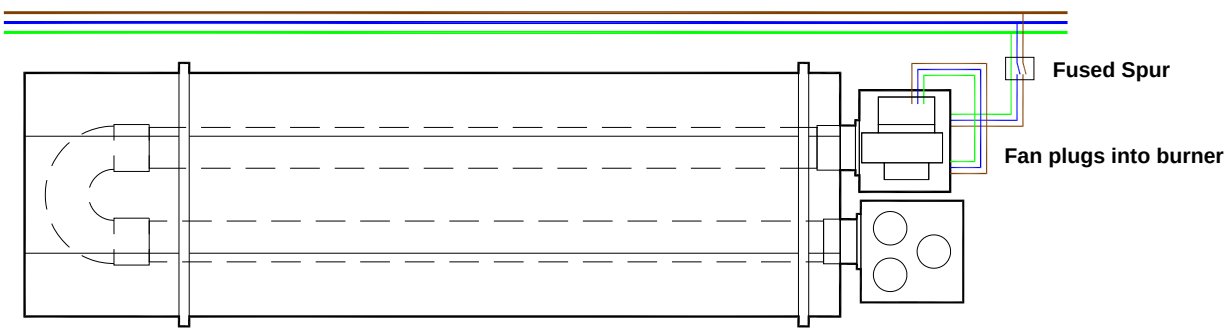
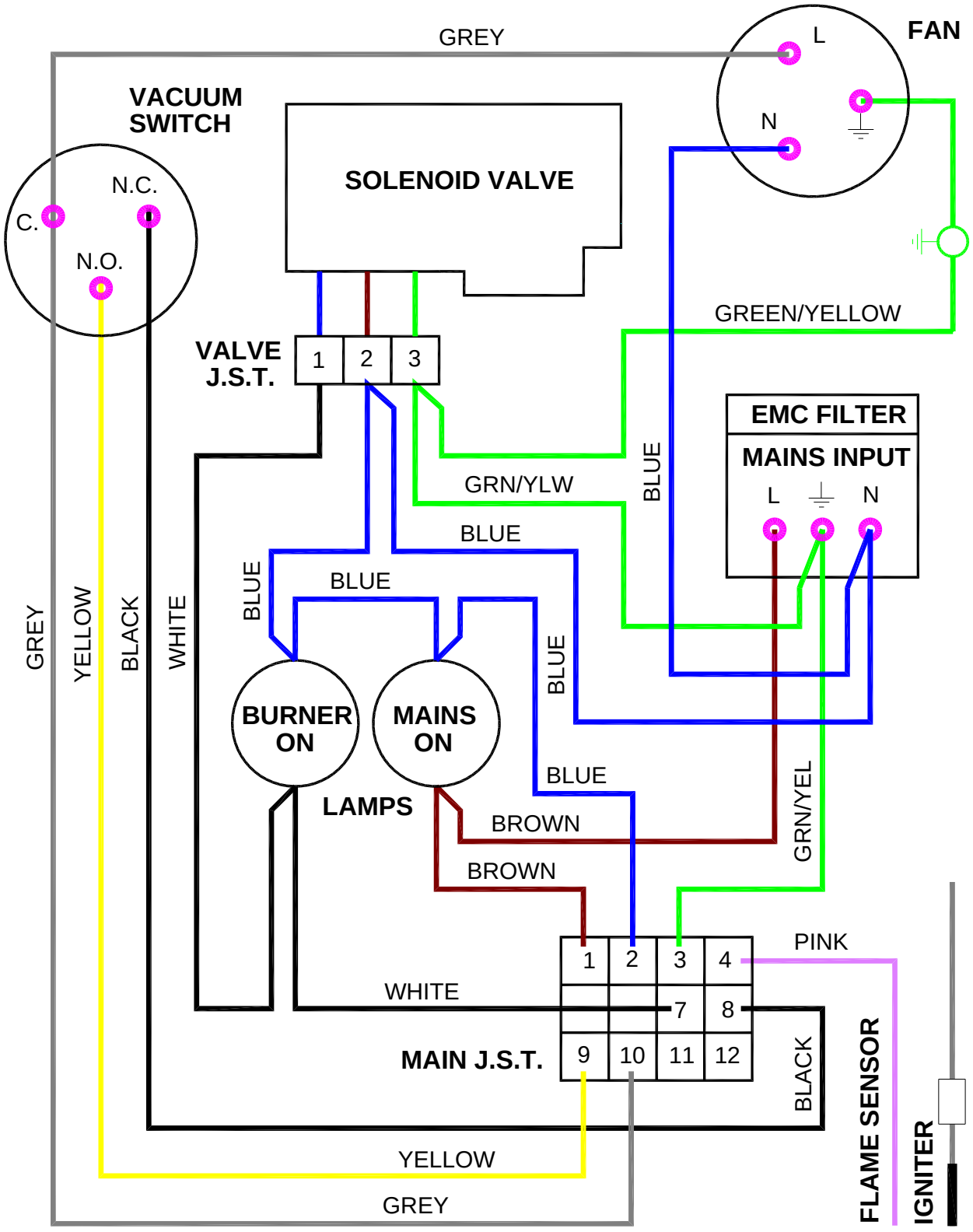


Figure 4.b Typical Wiring Connections

Figure 5. Internal Burner Wiring Diagram.



1.8 Ventilation Requirements

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

1.8.1 Unflued Radiant Heater

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

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

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

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

Mechanical Ventilation
Mechanical ventilation must be rated at minimum 10m³/h per kW input using appropriately sized fans and interlocked with heaters.
Natural Ventilation
BS EN 13410 should be used to size air vents to provide adequate ventilation, an example of this calculation is given below:

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

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

1.9.2 Flued Radiant Heater

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

Mechanical Ventilation
Mechanical ventilation must be installed to meet a minimum of 0.5 air changes per hour using appropriately sized fans and interlocked with the heaters.
Natural Ventilation
Low level ventilation openings with a free area of at least 2cm²/kW shall be provided. See section 5.2.2.2.2.1.

1.9 Flue and Combustion Air Inlet - Options

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

- **Option 1**
  For flued products of combustion and no ducted air please refer to Figure 6.a.
- **Option 2**
  For ducted air and products of combustion to ventilated area please refer to Figure 6.b.
- **Option 3**
  For flued products of combustion and ducted air via concentric pipe please refer to Figure 6.c.

1.9.1 Important Information

1.9.1.1 Option 1 and 2
A suitable flue system complying with EN1856-1 (type T250 N1 D Vm L11040 O50) should be used. Flue size 125mm diameter twin wall.

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

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

1.9.1.2 Option 3
A suitable flue system complying with EN1865-1 (type T200 P1 W V2 L50050 O00) should be used. Flue size 100mm diameter single wall.

The **maximum flue length** shall be 9.0m (including up to 2 x 90° bends plus the terminal). The minimum flue length shall be 1m.

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

1.9.2 Installation

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

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

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

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

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

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

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

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

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

1.9.3 Condensation

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

Horizontal flue should be fitted ensuring a slight gradient approx 5° towards 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.

1.9.4 Method of Jointing Tube

1.9.4.1 Option 1

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

1.9.4.2 Option 3

The components are joined by pushing the male spigot and female socket together until the stop is reached. No sealant is required, but can be applied if the formation of condensation is anticipated.

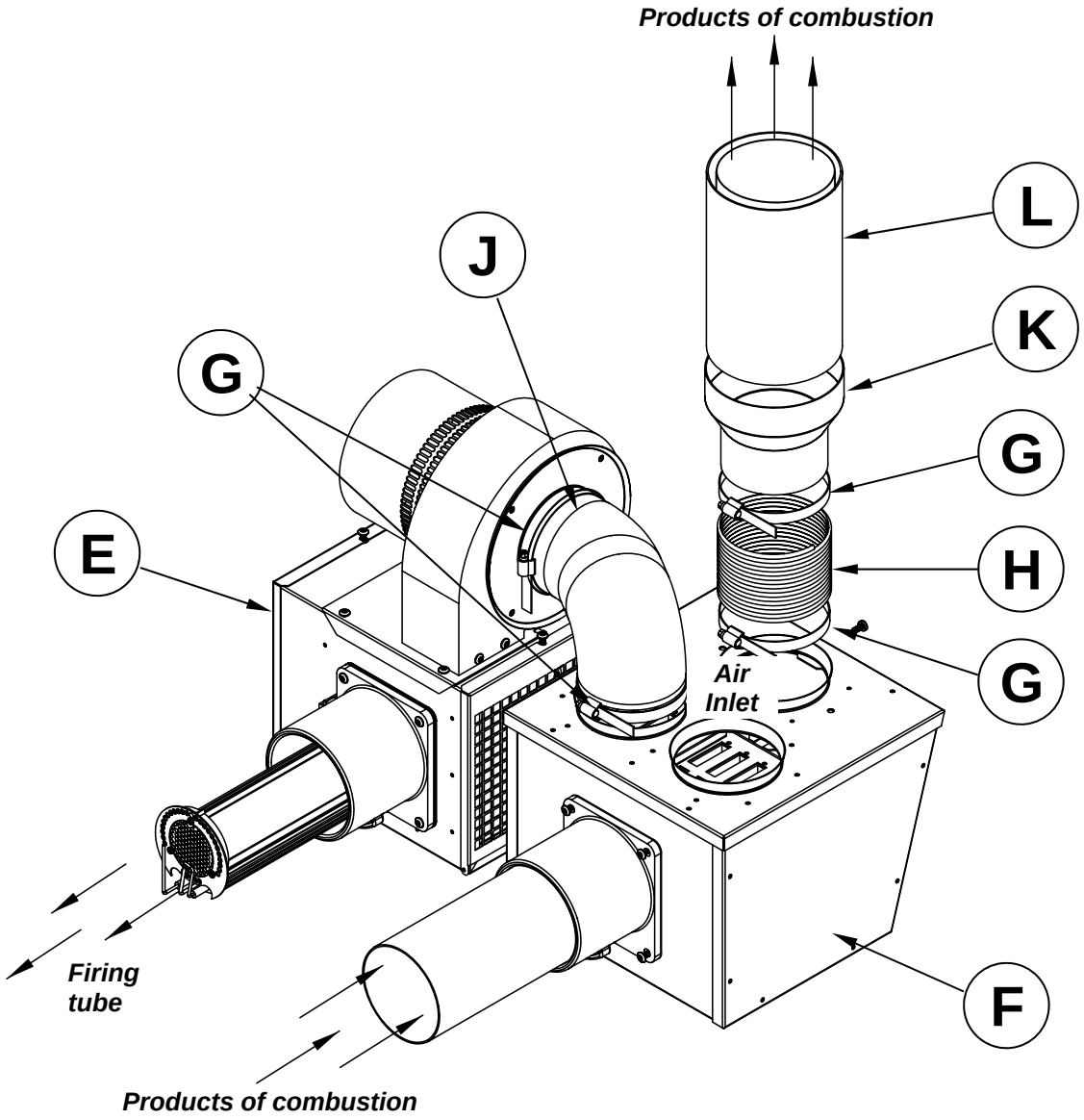
To seal use an applicator gun and apply a 4mm diameter bead of high temperature silicon jointing compound externally round the end of the male spigot and internally round the end of the female socket.

Push the male spigot into the female socket using a slight rotating movement to spread the jointing compound uniformly until both fittings have fully engaged.

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

Option 1 - Figure 6.a. Forced Burner with Heat Exchanger (Standard Flue)

For flued products of combustion and no ducted air



Maximum flue length = 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 BS 5440 pt.1

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

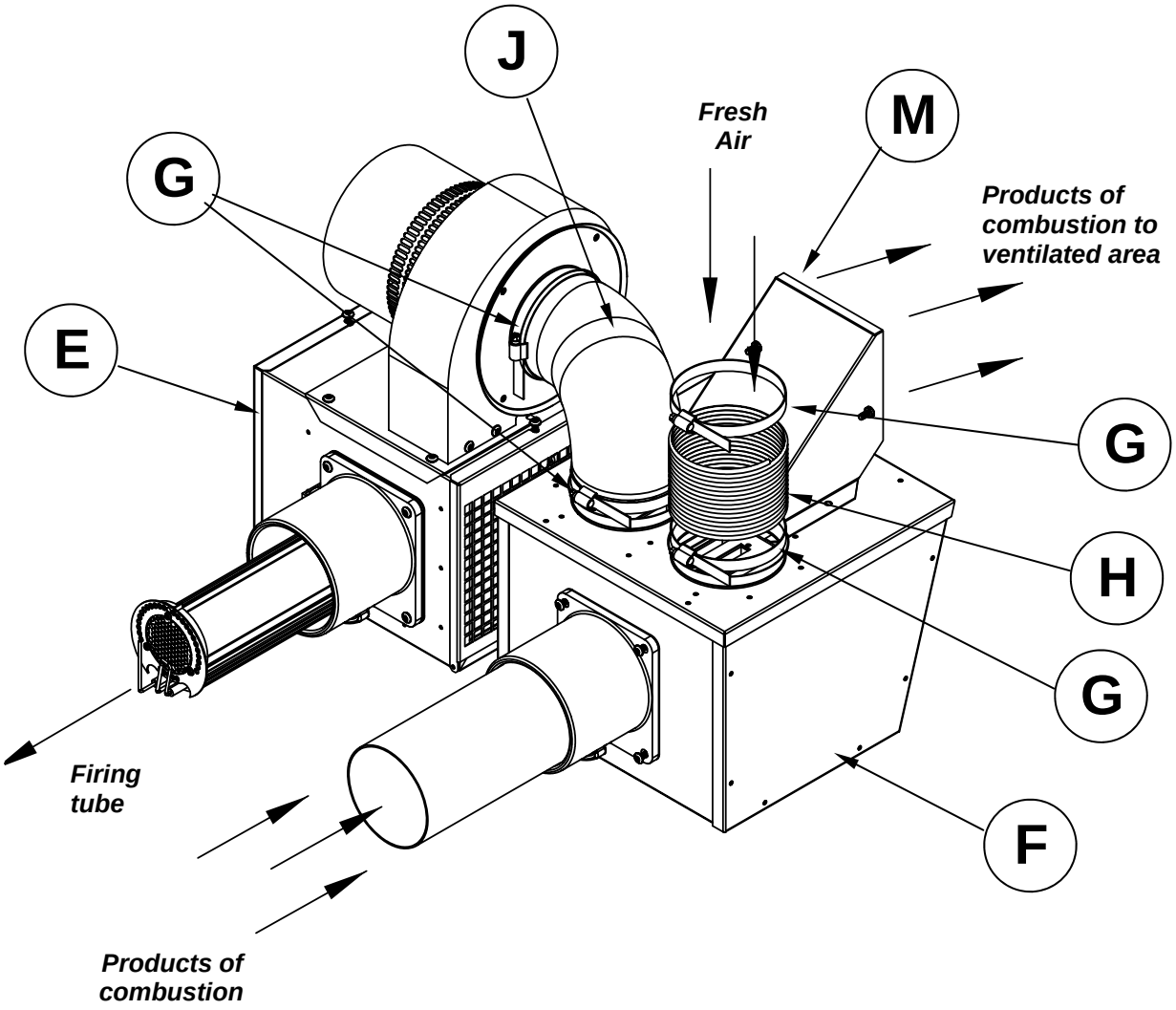
Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

E	**Forced Burner**
F	**Heat Exchanger**
G	**100mm (4ins) Clips x2**
H	**100mm (4ins) Flexible Flue**
J	**100mm (4ins) Flexible Flue to Fan**
K	**127mm (5ins) to 100mm (4ins) Reducer**
L	**127mm (5ins) Twin Wall Flue Pipe**

Ventilation requirements are as detailed in section 1.9

Option 2 - Figure 6.b. Forced Burner with Heat Exchanger (No External Flue)

For ducted air and products of combustion to ventilated area



E	**Forced Burner**
F	**Heat Exchanger**
G	**100mm (4ins) Clips x2**
H	**100mm (4ins) Flexible Flue**
J	**100mm (4ins) Flexible Flue to Fan**
M	**Shroud for unflued heater installation (supplied as standard)**

Ventilation requirements are as detailed in section 1.9

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

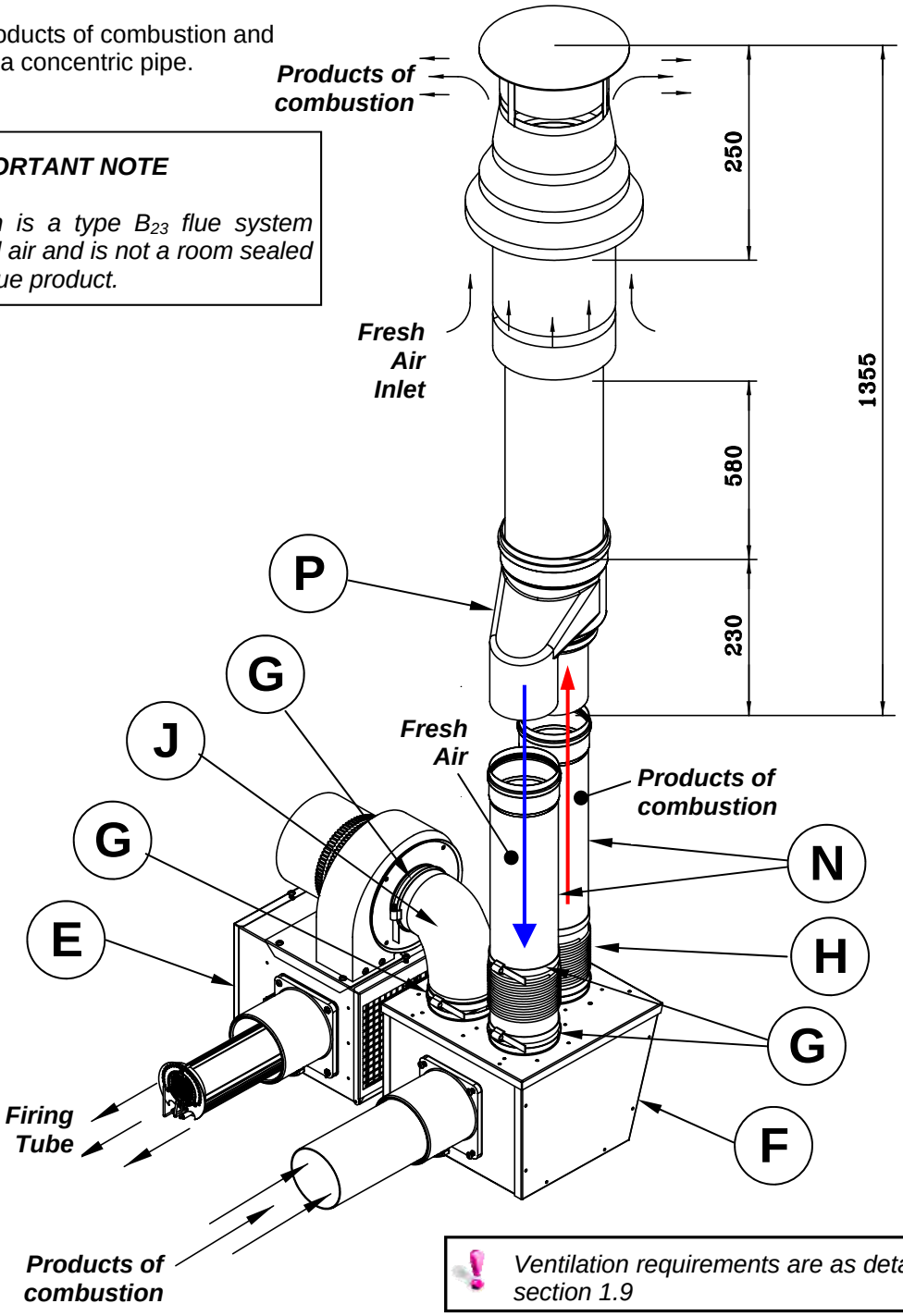
Maximum length = 9m
Minimum diameter = 100mm
Maximum no of bends = 2

Option 3 - 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 B_{23} flue system with ducted air and is not a room sealed balanced flue product.



E	**Forced Burner**
F	**Heat Exchanger**
G	**100mm (4ins) Clips x2**
H	**100mm (4ins) Flexible Flue**
J	**100mm (4ins) Flexible Flue to Fan**
N	**Flue Extension optional (0.25m/0.5m/1.0m)**
P	**Concentric Flue Terminal**

Ventilation requirements are as detailed in section 1.9

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 1.9.1 and BS 5440 pt.1

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

1.10 Table 3. Technical Details.

All heaters to run on **Natural Gas (G20)**

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

Heater Model	Heat Input kW		Gas Flowrate (m^3/hr)	Injector Pressure (mbar)	Injector Size (mm)	Size (h x l x w)	Weight (Kg)	Fan Rating (A)	Fan Type
	Gross	Nett							
VSXE20UT	20.0	18.0	1.9	10.0	1.7	420x4100x675	75	0.5	2501
VSXE25UT	25.0	22.5	2.4	9.4	1.9	420x4100x675	75	1.0	2507
VSXE30UT	32.0	28.8	3.1	13.0	2.0	420x4100x675	75	1.0	2507
VSXE35UT	36.0	32.4	3.4	12.3	2.3	420x5900x675	102	1.0	2507
VSXE40UT	40.0	36.0	3.8	12.8	2.4	420x5900x675	102	0.5	2560
VSXE45UT	44.0	39.6	4.2	11.6	2.9	420x5900x675	102	0.5	2560
VSXE50UT	49.5	44.6	4.7	12.8	2.5	420x7660x675	130	0.5	2560

Table 4. Flue details

Heater Model	Mass Flow Rate of Flue Gasses (kg/s)	Flue Pressure (Pa) Maximum Flue Resistance	Flue Gas Temp (°C)
VSXE20UT	0.0118	35 - 42	180 - 240
VSXE25UT	0.0134		
VSXE30UT	0.0138		
VSXE35UT	0.0167		
VSXE40UT	0.0181		
VSXE45UT	0.0193		
VSXE50UT	0.224		

Notes

2. User & Operating Instructions.

2.1 To Start the Heater

1. Ensure gas supply is turned on.

2. Electrical supply to the controls is on.

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

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

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

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

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

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

   Call an AmbiRad Service Engineer.

2.2. 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.

2.3. 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.

2.4 Frequency of Servicing

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

The manufacturer offers a maintenance service.

Details are available on request.

For Service requirements, please contact AmbiRad

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

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