

Installation & Operating Manual



#### Warnings

Nortek Global HVAC equipment must be installed and maintained in accordance with the requirements of the Codes of Practice or rules in force. All external wiring must comply with the codes of practice or rules in force in the country of installation.

Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read instructions before installing or servicing this equipment. For use with all Vision VSX models with Generation code BB & BC. Gas-fired appliances are not designed for use in hazardous atmospheres containing flammable vapours or combustible dust, containing chlorinated or halogenated hydrocarbons, or in applications with airborne silicone substances.



# Introduction.

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

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

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

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

All Dimensions shown are in mm unless otherwise stated.

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

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# 1. Installation Requirements.

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

## 1.1 Health and Safety

Nortek gas fired 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.

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

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

# 1.2 Model Definitions

**VSXUT** = AmbiRad 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.

### 1.3 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

Model	Recommended Mounting Height (m)						
kW	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						

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 above.

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





Figure 1.b. Recommended Methods of Heater Suspension.

# **1.4** 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





VSXUT	20/25/30	35/40	45/50	
Above Reflector	Α	100	100	100
Above Burner / Heater Outlet	В	500	500	500
To the Sides	С	1300	1300	1300
Below Tubes	D	2300	2500	2500
Horizontally from Heater Outlet (UNFLUED)	Е	1200	1200	1200
End Wall	F	700	700	700

# 1.5 Gas Connection and Supply



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 2 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

onto the burner itself.

the gas supply close to the heater, but not

the heater not to apply excessive turning force to the internal controls.

Figure 3. Correct Installation of Flexible Gas Connection

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  $\frac{1}{2}$ " 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 later is the only method recommended by the institute of gas engineers, the hose manufacturer, and Nortek Global HVAC (UK) Ltd and must

only be carried out by a qualified/ competent gas engineer.



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.



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.





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 R <sup>1</sup> / <sub>2</sub> <sup>1</sup> / <sub>2</sub> in BSP Internal Thread

# **1.6 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 0.5mm<sup>2</sup> and comply with BS 6500. The wires in the mains lead are coloured in accordance with the following code: Green & Yellow Earth; Blue Neutral;

#### Figure 4.b Typical Wiring Connections

### 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 (UK) Ltd approved controls. Please refer to control manual for siting and installation details. Where alternative manufactures controls are used, please refer to their in-

structions for their siting and installation details.



Figure 4.a Single Phase Wiring



Figure 5. Internal Burner Wiring Diagram.



# **1.7 Ventilation Requirements**

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

#### 1.7.1 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/m<sup>3</sup>, 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 1.5). It should be ensured that the combustion gases do not impinge on any combustible materials.

#### **Mechanical Ventilation**

Mechanical ventilation must be rated at minimum 10m<sup>3</sup>/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 17.36cm<sup>2</sup>/kW free area.

#### 1.7.2 Flued Radiant Heater

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

#### **Mechanical Ventilation**

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

#### **Natural Ventilation**

Low level ventilation openings with a free area of at least 2cm<sup>2</sup>/kW shall be provided. See section 5.2.2.2.1.

# 1.8 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.

# **1.8.1 Important Information**

#### 1.8.1.1 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  $2 \times 90^{\circ}$  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.

#### 1.8.1.2 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  $2 \times 90^{\circ}$  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.

## 1.8.2 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.

# 1.8.3 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  $5^{\circ}$  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.

# **1.8.4 Method of Jointing Tube**

#### 1.8.4.1 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.

#### 1.8.4.2 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



Products of combustion

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 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

Е	Forced Burner
F	Heat Exchanger
G	100mm (4ins) Clips x2
Н	100mm (4ins) Flexible Flue
J	100mm (4ins) Flexible Flue to Fan
κ	127mm (5ins) to 100mm (4ins) Reducer
L	127mm (5ins) Twin Wall Flue Pipe
	Ventilation requirements are as detailed in section 1.7

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

For ducted air and products of combustion to ventilated area



# Option 3 - Figure 6.c. Forced Burner with Heat Exchanger (with Concentric Flue)



# 1.9 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	Heat Input kW		Gas	Injector	Injector	Size	Weight	Fan	Fan
Model	Gross	Nett	(m <sup>3</sup> /hr)	(mbar)	(mm)	(h x l x w)	(Kg)	(A)	Туре
VSX20UT2M	20.0	18.0	1.9	10.0	1.7	450x4047x746	114	0.5	2501
VSX25UT2M	25.0	22.5	2.4	9.4	1.9	450x4047x746	114	1.0	2507
VSX30UT2M	30.0	27.0	2.9	10.5	2.0	450x4047x746	114	1.0	2507
VSX30UT3M	30.0	27.0	2.9	10.5	2.0	450x5927x746	158	1.0	2507
VSX35UT3M	36.0	32.4	3.4	12.3	2.3	450x5927x746	158	1.0	2507
VSX40UT3M	40.0	36.0	3.8	12.8	2.4	450x5927x746	158	0.5	2560
VSX45UT3M	44.0	39.6	4.2	11.6	2.9	450x5927x746	158	0.5	2560
VSX45UT4M	44.0	39.6	4.2	11.6	2.9	450x7692x746	205	0.5	2560
VSX50UT4M	49.5	44.6	4.7	12.8	2.5L	450x7692x746	205	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)	
VSX20UT	0.0116			
VSX25UT	0.0132			
VSX30UT	0.0133			
VSX35UT	0.0166	35 - 42	190 - 250	
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. lis-

Please	ensure	that	all	packagin	g is	d

# 2.1

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



posed 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.



# 2.2 Assembly Notes.



# 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.



### 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.



### sembly.

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.



### VSX3M VSX2M VSX4M COLOUR CODE 30/35/40/ 20/25/30 45/50 45 **Burner** 1x **1x** Heat Exchanger **1x 1x 1x 1**x U Bend **2x 4x** Inner Reflectors **2x 4x** Outer Canopy 3x **5**x **Brackets** No.5 15x 13x Torque Screw 12x **20x** M6 Mudwasher

# 2.3 Identification check list

COLOUR CODE	VSX2M 20/25/30	VSX3M 30/35/40/ 45	VSX4M 45/50
Inner End Caps	<b>2</b> x	2x	<b>2</b> x
Outer Canopy End Caps	<b>2</b> x	2x	<b>2</b> x
Tubes	<b>2</b> x	2x	<b>4</b> x
Turbulators	2x	3x	3x
Couplers	<b>2</b> x	2x	<b>4x</b>
M8 U Bolt	6x	8x	<b>10x</b>
M8 Full Nut	<mark>16x</mark>	<mark>22x</mark>	<mark>28x</mark>
M4 x 10 Pozi Setpin	<b>7</b> x	8x	9x

COLOUR CODE	VSX2M 20/25/30	VSX3M 30/35/40/ 45	VSX4M 45/50	COLOUR CODE	VS 20/:
M6 Washer	<b>4</b> x	<mark>6x</mark>	8x	M4 Full Nut	
M6 Full Nut	6x	<mark>10x</mark>	<mark>14x</mark>	M4 Washer	
M6 x 35 Setpin	<b>4</b> x	6x	8x	M6 x 15 Setpin	

# COLOUR CODE V 3A2IM 20/25/30 30/35/40/ 45 V 3A4M 45/50 M4 Full Nut Image: Color of the second second

X2M

# 2.4 Prior to assembly

- Ensure the area in which you are working is safe and clear of obstructions.
- assem-

VSX3M

VSX4M

- Identify with the components in the check list and in which order they will be bled.
- 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

# 2.5 Step by step installation.

# 2.5.1 Tubes and Turbulators

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.



**VSX50 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.





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.



#### 2.5.2 Brackets, U Bolts and U bend.

4 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..



5 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 fully tighten at this stage.** 



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













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#### 2.5.3 Reflectors.

**i**) Remove protective film before starting.

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

7 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!**

<sup>8</sup> 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.



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.



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.













# 2.5.4 End Caps

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



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



# 2.5.5 Canopies

# Remove protective film before starting.

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.

![](_page_19_Picture_11.jpeg)

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.

![](_page_19_Picture_13.jpeg)

![](_page_19_Picture_14.jpeg)

![](_page_19_Picture_15.jpeg)

![](_page_19_Picture_16.jpeg)

![](_page_19_Picture_17.jpeg)

![](_page_19_Picture_18.jpeg)

![](_page_19_Picture_19.jpeg)

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# 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**.

![](_page_20_Picture_2.jpeg)

![](_page_20_Picture_3.jpeg)

# 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.

![](_page_20_Picture_6.jpeg)

### 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 12 for details of 'W', 'X', 'Y' and 'Z' fastening and locations.

![](_page_21_Figure_0.jpeg)

![](_page_21_Figure_1.jpeg)

Figure 8. VSX3M 30/35/40/45

![](_page_22_Figure_1.jpeg)

![](_page_23_Figure_0.jpeg)

Figure 10. VSX Heater Breakdown (3 module shown)

![](_page_24_Figure_1.jpeg)

![](_page_25_Figure_0.jpeg)

# 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.

![](_page_26_Figure_6.jpeg)

#### 4.3 Burner Removal

![](_page_27_Picture_1.jpeg)

Step 1 Isolate power and gas supplies.

Step 2 Unplug the power connectors.

![](_page_27_Picture_4.jpeg)

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

![](_page_27_Picture_6.jpeg)

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

![](_page_27_Picture_8.jpeg)

Step 5 slacken the jubilee clip attaching the pre-heated air hose to the heat exchanger and remove the flexible hose from the burner.

![](_page_27_Picture_10.jpeg)

Step 6 Slacken the set screw on the burner support casting to enable the burner to be removed from the radiant tube.

Step 7 Remove the burner and position the burner in a safe area to prevent the burner or components attached to the burner from falling to the ground.

![](_page_27_Picture_13.jpeg)

#### 4.4 Burner Gas Injector Servicing

Step 1.a Remove the burner support casting and gasket.

Step 1.b The burner head assembly can be

![](_page_27_Picture_17.jpeg)

disconnected by separating the connectors of the ignition lead assembly and removing the pressure switch silicon tube.

Step 2 The gas injector can be inspected and

![](_page_28_Picture_0.jpeg)

replaced if contaminated or blocked.

When replacing the gas injector ensure approved thread sealant is used. Step 3 Reconnect ignition leads and sili-

![](_page_28_Picture_3.jpeg)

cone 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 ensuring the 5 holes on the outer ring

![](_page_28_Figure_8.jpeg)

are aligned alongside the probes. Step 3 The condition of the igniter assembly can

![](_page_28_Picture_10.jpeg)

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

Step 4 Refit the electrode assembly and ensure the connections are secure to prevent arcing of

![](_page_28_Picture_13.jpeg)

the spark electrode.

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

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

4.6 Combustion Fan Assembly

![](_page_28_Figure_18.jpeg)

Figure 12. Burner head detail

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

Step 2 Remove fan screws and unplug from burner box.

![](_page_29_Picture_2.jpeg)

Step 3 The combustion fan can now be detached.

![](_page_29_Picture_4.jpeg)

Step 4 Remove the fan orifice plate spigot and spinning.

![](_page_29_Picture_6.jpeg)

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.

![](_page_29_Picture_9.jpeg)

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

![](_page_29_Picture_16.jpeg)

appliance. Carefully noting their condition and position. Replace turbulators if necessary. Step 5 The turbulators should be cleaned with a

![](_page_29_Picture_18.jpeg)

soft brush. Step 3 If required the interior of the tubes can

![](_page_30_Picture_1.jpeg)

then be cleaned using an industrial vacuum cleaner or by using long poles and a scraper.

Step 4 Refit components.

#### 4.8 Heat exchanger Servicing

Step 1 Remove the flue connections

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 Sweeping of Flue

Inspect the fresh air inlet duct and vent to ensure they are free from any blockage or obstruction. The air inlet terminal and vent terminal should be inspected to ensure they are not liable to obstruction.

### 4.11 Recommissioning 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.

![](_page_30_Picture_11.jpeg)

Step 2 Slacken casing support screws and remove heat exchanger from the radiant tube. Step 3 Remove any dust and dirt from the

![](_page_30_Picture_13.jpeg)

heat exchanger & refit. 4.9 Reflector Servicing

# 5. Spare Parts.

# **Required Spares**

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

Return tube others

Note Any spare part components that are not approved by Nortek Global HVAC (UK) Ltd could invalidate the approval of the appliance and validity of the warranty.

ltem	Description	Part No.	ltem	Description	Part No.
E	Ignition Controller	2015		Pressure Switch:	201676
	Nat Gas Valve Twin sol reg 220/240	202658		Amber Neon (Burner On)	2175
	Mains Input Filter	201292		Red Neon (Mains On)	2180
X	Ignitor Assembly	201284		Combustion Fan	See Section 1.10
	Pepperpot Head	200988		Gasket Set	201488
	Injector	See section 1.10	$\bigcirc$	Cables: Spark Electrode <i>(black)</i>	900225-2
	Jet Carrier (all except *)	200420	Re	Rectification lead ( <i>purple</i> ) Earth lead (green/yellow)	900225-3 900225-1
	Jet Carrier * VSX50 ONLY	201630		Ducted Air Hose	201321
Q	Flame Plate (20/25 ONLY)	201358	0	Hose Clamp	7541
	Turbulators Burner tube Return tube 25/30 Return tube others	(2M)/45(4M)/50	6618T 200015T 6619T		

6619T

# 6. Fault Finding Guide.

![](_page_32_Figure_1.jpeg)

# 7. Replacing Parts.

![](_page_33_Picture_1.jpeg)

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

#### 7.1 Burner Controller Replacement

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

Step 2 Undo 2 screws from the lid to the controller bracket and remove. Disconnect burner controller from the wiring harness.

![](_page_33_Picture_6.jpeg)

Step 3 Disconnect the HT Lead from burner controller.

![](_page_33_Picture_8.jpeg)

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

![](_page_33_Picture_10.jpeg)

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 doors.

#### 7.2 Air Pressure Switch Replacement

Step 1 Disconnect the two silicone impulse tubes and three wiring connections making note

![](_page_33_Picture_16.jpeg)

of replacement positions.

![](_page_33_Picture_18.jpeg)

Step 2 Remove the two screws as shown below.

Step 3 The air pressure switch can now be removed.

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

Step 5 Test product and close access doors.

![](_page_33_Picture_23.jpeg)

#### 7.3 Gas Valve Replacement

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

Step 2 Open the left hand access door and detach the impulse hoses from the air pressure

![](_page_34_Picture_3.jpeg)

#### switch.

Step 3 Remove the 4 screws holding the burner head onto the burner assembly and carefully

![](_page_34_Picture_6.jpeg)

pull burner head assembly from housing. Step 4 The burner head can now be detached by disconnecting the impulse tube and the burner head wiring (ignition and rectification

![](_page_34_Picture_8.jpeg)

leads).

Step 5 From within the combustion chamber, remove the two screws holding the front of the

![](_page_34_Picture_11.jpeg)

gas valve.

Step 6 Turning the housing over, remove the four screws holding the rear burner plate in

![](_page_34_Picture_14.jpeg)

![](_page_34_Figure_15.jpeg)

Step 7 Open the two side doors and remove the rear plate assembly.

Step 8 Whilst the valve is still attached to the plate, the jet carrier, gas inlet, and wiring harness can now be detached from the gas valve.

Step 9 The two screws retaining the gas valve can then be removed.

Step 10 The gas valve can now be replaced.

![](_page_34_Picture_20.jpeg)

Step 11 Refit all components in reverse order.

Step 12 Set gas pressures to data badge or as per section 1.11 and ensure reliable burner performance.

Step 13 Test product and close access doors.

#### 8.1 To Start the Heater

- 1. Ensure gas supply is turned on.
- 2. Electrical supply to the controls is on.
- 3. Ensure that the controls are correctly set i.e.;
  - Clock is correctly set.
  - Heater program is correctly set.
  - Required room temp is correctly set
- 4. Once the heating controller 'calls for heat' power will be supplied to the heater(s). The red neon will then illuminate.
- 5. After a pre-purge period of 10 seconds the burner will ignite and the amber neon will then illuminate.
- 6. If lockout occurs press the lockout reset button (if available), or switch off electrical supply and restart after 15 seconds.
- 7. If lockout occurs three times consecutively switch off and isolate the gas and electricity supplies. Contact the *Nortek Global HVAC (UK) Ltd* Service department.

#### 8.2. To Switch Off Heater

- 1. Switch off electrical supply to the heater. The burner will stop and the fan will shut off.
- 2. If the heater is to be switched off for periods in excess of one week it is highly recommended that both the gas and the electrical supplies are turned off.

#### 8.3. Routine Maintenance between Service Intervals

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

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

### 8.4 Frequency of Servicing

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

The manufacturer offers a maintenance service.

Details are available on request.

For Service requirements, please contact Nortek Global HVAC (UK) Ltd.

![](_page_35_Picture_24.jpeg)

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**AFFIX AGENTS DETAILS HERE**