REZNOR

ASSEMBLY MANUAL

Nor-Ray-Vac Modulating

Continuous Radiant Tube System

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.

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

NORTEK GLOBAL HVAC

ErP 2018 ErP Lot 20 Seasonal Efficiency and NOx compliant

Part No. D301041 Issue 1

CE UK CA

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.

NOTE: FOR INSTALLATION, COMMISSIONING AND SERVICING - SEE BOOKLET 1, DOCUMENT REF 700070

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

Wrench with Extension

13mm Socket

Tape Measure

4 & 5mm Allen Keys

*Saw

*Pop Riveter & 3/16" Rivets

*Silicone Sealant & Gun

2.2 Assembly Notes.

Please read these assembly notes in conjunction with the correct assembly drawings (Sections 2.2.1 to 2.21.1)

The system is assembled at high level suspended by chains from first fixings to the roof structure. (First fixings by others)

2.2.1 Radiant Tubes

All black radiant tubes are 101.6mm (4") O/D, Calcoat and supplied in 5.2m lengths.

These may need to be cut depending on the system drawing design.

Combustion chambers are 2.6m in length and increase in diameter to 127mm (5") around the burner turret.

All tubing, combustion chambers, dampers and tube fittings are connected by 'wrap-around' stainless steel couplers which clamp by means of two high tensile stainless steel set pins. (See section 2.2.2)

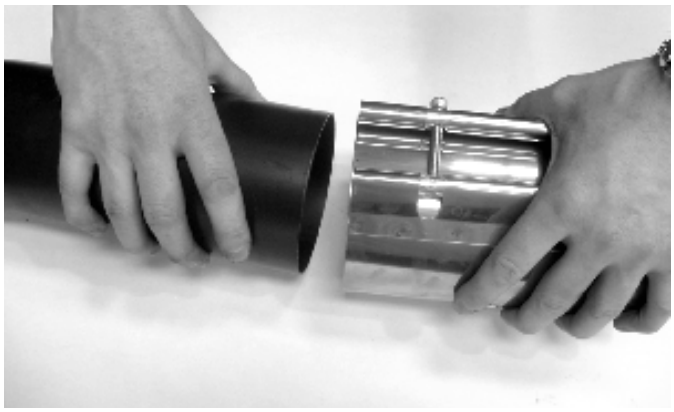
2.2.2 Couplers

The Nor-Ray-Vac Tube Coupler is a screw tightening, self aligning - positive located tubular coupler. Manufactured in a non–corrosive stainless steel it is available in both 100mm (4") and 150mm (6").

Two high tensile stainless steel set pins tighten to clamp the coupler onto the tube whilst a rivet provides a centralised permanent stop to give the joint equidistant.

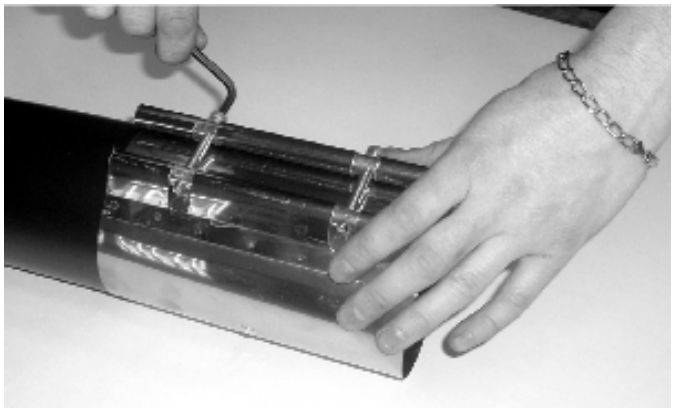
The following procedure explains the correct method of assembly:

Before assembly, carefully loosen the two screws. Position the coupler onto the first tube ensuring that the bars are positioned uppermost.

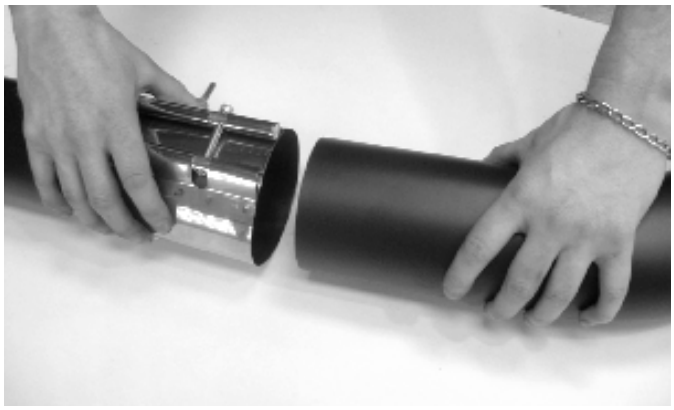


Slide the coupler over the tube ensuring that the rivet stop has butted up to the tube end.

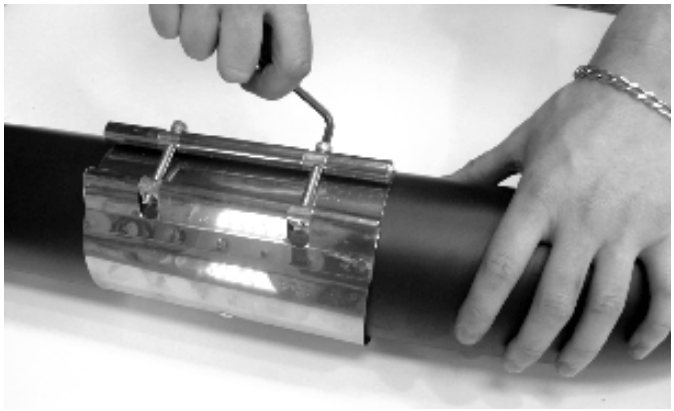
Using a 5mm allen key, tighten the relevant pin. **DO NOT OVERTIGHTEN.**



Slide the second tube into the coupler ensuring that the rivet stop has butted up to the tube end.

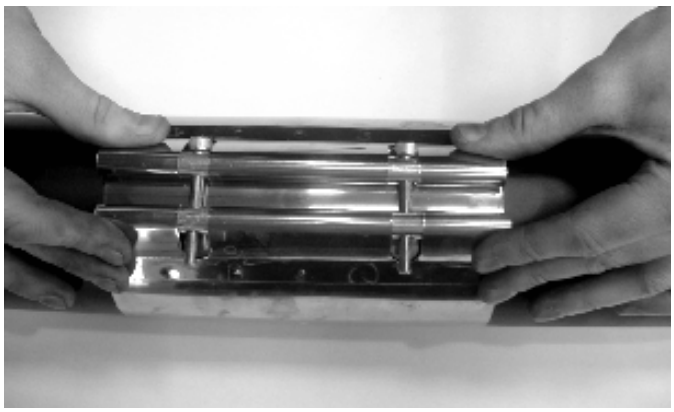


Using the 6mm allen key, tighten the second pin. **DO NOT OVERTIGHTEN.**



Moving between the two set pins, tighten both ensuring that equal pressure is applied to each set pin in turn.

If all steps have been followed correctly, the coupler should have aligned itself parallel to the two tubes and a slight indentation can be observed. Using the 6mm allen key, finally tighten each screw by a further quarter turn. If a power tool is used, use a torque limit setting of 6.6 lbs f/ft (0.91kgf/m) must be achieved.



2.2.3 Reflectors

The radiant tube sections of the system are fitted with reflectors made of either stainless steel or aludip to direct infra-red rays downwards.

The reflectors have a unique design profile to maximise the reflected radiant heat, minimise convective loss, and maximise on rigidity.

The reflectors are overlapped and held in position by the reflector bracket assembly.

There are two styles of reflectors:

2.2.3.1 Standard Reflectors

These 2.4m long reflectors are positioned above the tube to radiate the heat downwards and are fixed to the radiant tube via a reflector bracket (see section 2.5).

The combustion chamber reflector has a rectangular hole and slot, pre cut to allow for burner combustion chamber and support lug fitting.

Combustion Chamber Reflector

2.2.3.2 Perimeter Reflectors

Perimeter reflectors are used when the radiant tube is mounted at the perimeter of the building. They have the same profile as standard reflectors but extended one side to direct the radiant heat away from the wall.

The perimeter combustion chamber reflectors have a cut-out for the combustion chamber turret and suspension lug at both ends so that the one reflector can be used for either left or right hand perimeter systems.

Note: when overlapping the perimeter combustion chamber reflector, extra overlap is required to cover the pre-cut holes and slot.

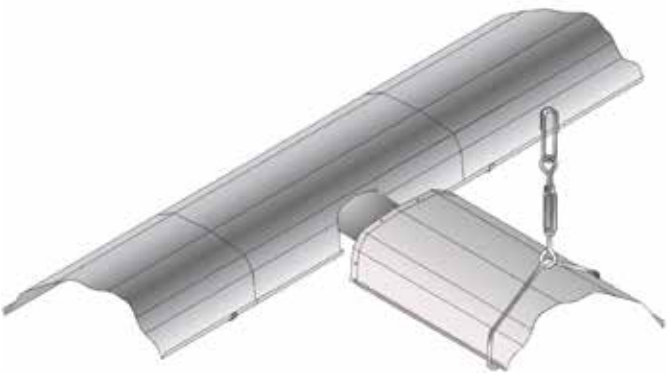
2.2.3.3 Corner Reflectors

Used where radiant tubes are joined with a 90° bend. The corner reflector comes in two pieces and is assembled on-site.

Corner Reflector

2.2.3.4 Tee piece Reflectors

Used where a radiant tube connects to another at right angles. The reflector is a special short section with a central tube cut out.



Tee section

2.2.4 Brackets

There are two styles of brackets:

2.2.4.1 Suspension brackets.

Suspension brackets are made from a one piece construction and are formed to support the tube and reflector alike. The wrap around ends are aligned to hold a turnbuckle eyelet in the correct hanging position.

Standard Suspension Bracket

A perimeter suspension bracket is available which has the same profile as the standard brackets but extended one side to accommodate the perimeter reflector.

Perimeter Suspension Bracket

2.2.4.2 Reflector Support Bracket

Reflector Support Brackets are a two piece construction. The first half is formed to seat on top of the radiant tube and
supports the reflector sides in position. The second part clamps around the bottom half of the tube and is fixed in position via a fastener.

Standard Reflector Support Bracket

The reflector support bracket has two functions depending on the position of the fixing screws.

- To fix the reflector into position.
- To allow the reflector to slide within the bracket for thermal expansion.

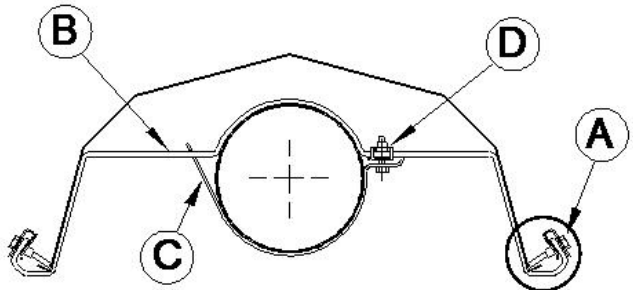
A perimeter reflector support bracket is available which has the same profile as the standard bracket but extended one

Perimeter Reflector Support Bracket

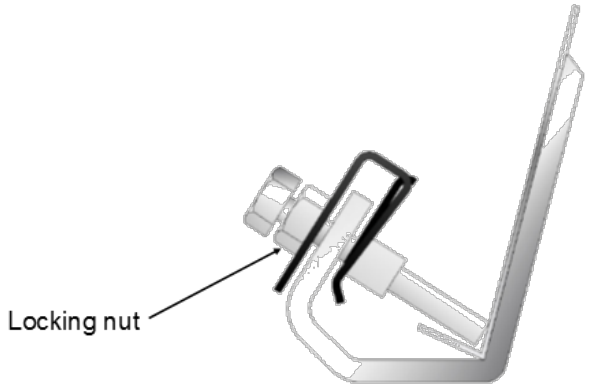
2.2.4.2.1 Attachment of reflector bracket.

Fit the reflector bracket (B) around the tube and tighten the set pin (D) to clamp the central clip (C) to the tube.

The set pins (A) positioned at both edges of the bracket (B) are used to provide either a fixed joint or a sliding joint.

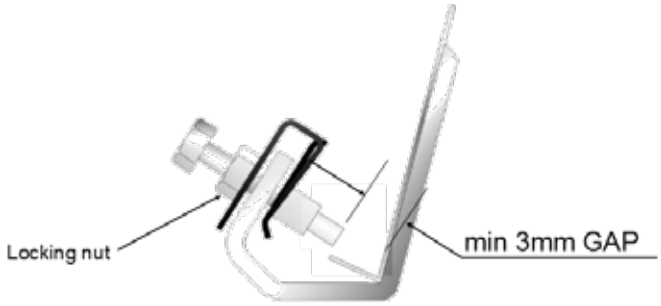


'Fixed Joint' detail.



Fully tighten these screws for fixed joints. Then secure with the locking nut.

'Sliding Joint' detail.



⚠ Leave a minimum 3mm gap clearance between reflector and screws for a sliding joint. Then secure with the locking nut. The reflector overlap after each burner must be a 'sliding joint', to allow for thermal expansion.

The next downstream reflector overlap must be a 'fixed joint'. This pattern of alternate sliding and fixed joints will continue up to the next in line burner or damper assembly.

A reflector support bracket must be positioned at the end vent and at the damper end of each radiant branch, plus either side of a reflector corner and reflector tee section.
⚠ **These units must be 'fixed joints'.**

2.2.5 Burner

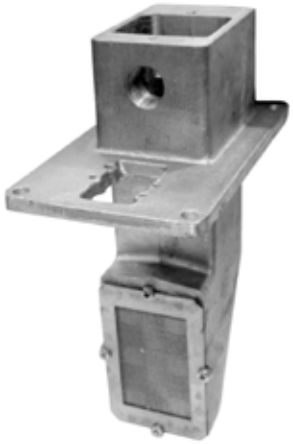
2.2.5.1 Burner Unit

Each burner will consist of a burner control housing (BCH) of chassis style with detachable pivoting lid. All control wiring to the burner head is within the BCH, which also contains a combination gas valve comprising of 2 class 2 solenoid valves and dedicated zero governor, a full sequence controller and cassette air filter for primary air supply to the burner. End Vent Burners also include a vacuum switch. Externally, the BCH has neon lights indicate mains on and burner on modes, mains input socket and 'in-line' outlet socket for End Vent Burners only.

The air and gas are pre-mixed to stoichiometric proportions within the burner head assembly, prior to being admitted to the point of combustion.

Ignition is by an electric arc forward of the face of the burner head on to the main frame.

2.2.5.2 Burner Head



A burner head assembly of lightweight cast aluminium construction, a ceramic style burner head insert, maintained in position by the flame retention grid. The casting assembly also accommodates the gas jet, air shutter and mixing chamber.

The ignition and flame sensing electrode assembly is mounted to the casting flange of the burner face.

2.2.6 End Vent Module (EVM)

At the start of each radiant branch an end vent module is connected to the rear of the first combustion chamber. The end vent module externally maintains the lines of the reflector profile.

To comply with European standards that state air flow must be proven in each radiant branch, the end vent burner incorporates an air pressure switch. The end vent module incorporates the flow sensing pipework carrier air orifice plate and optional silencer box to reduce noise levels.

2.2.7 Vacuum fans

A low noise robust steel plate fabricated centrifugal fan coated with heat and corrosion resistant paint, capable of a static pressure of either 29 mbar or 45 mbar at 20°C and directly coupled to a totally enclosed motor to be fitted at the end of the tube system.

The fan exhausts the products of combustion from the system discharging through an outlet flue pipe to atmosphere external to the building.

The maximum operating temperature is 200°C.

The fan motor is IP55 rated for external use.

2.3 Installation of End Vent Section

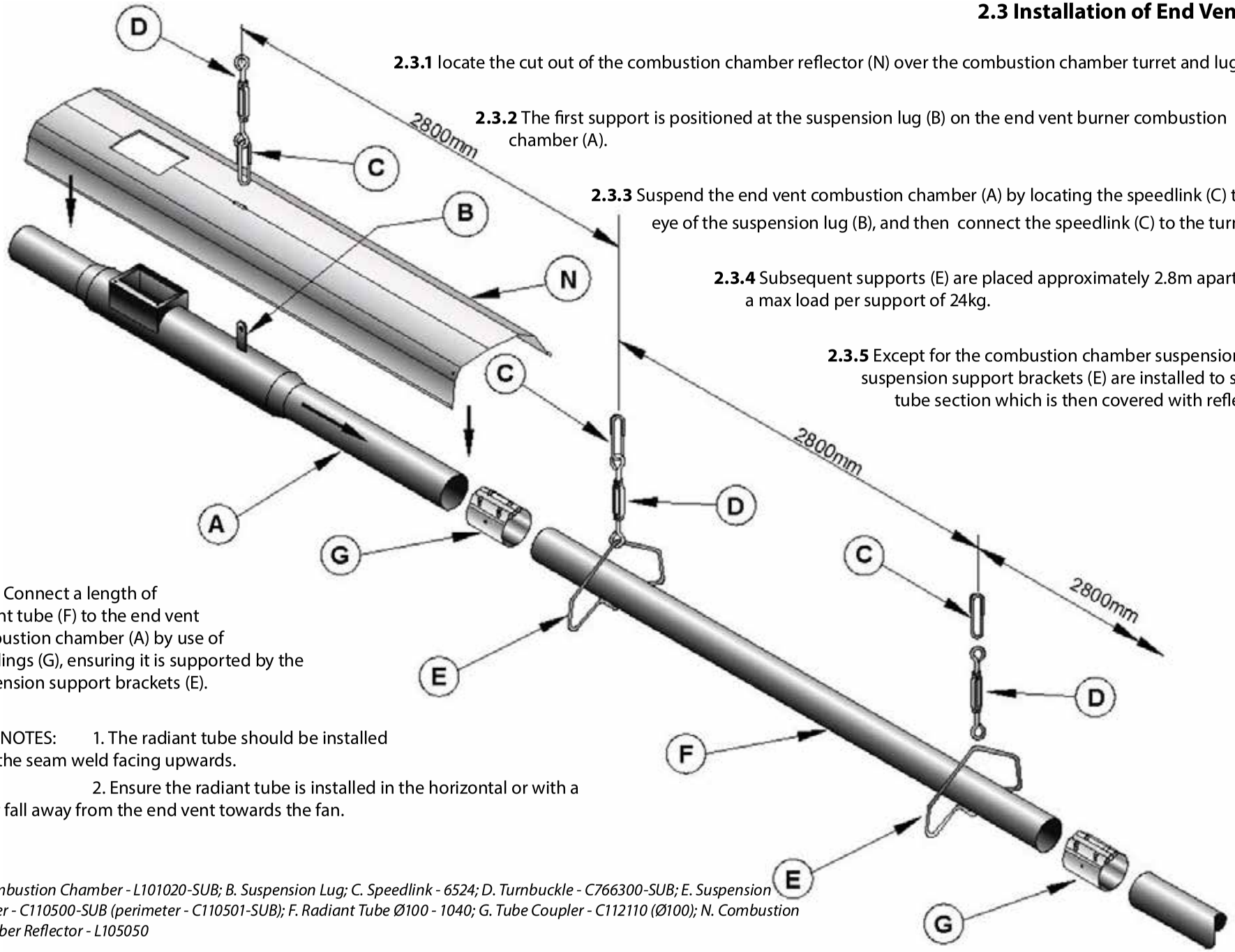
2.3.1 locate the cut out of the combustion chamber reflector (N) over the combustion chamber turret and lug (B)

2.3.2 The first support is positioned at the suspension lug (B) on the end vent burner combustion chamber (A).

2.3.3 Suspend the end vent combustion chamber (A) by locating the speedlink (C) through the eye of the suspension lug (B), and then connect the speedlink (C) to the turnbuckle (D).

2.3.4 Subsequent supports (E) are placed approximately 2.8m apart, This gives a max load per support of 24kg.

2.3.5 Except for the combustion chamber suspension lug (B), suspension support brackets (E) are installed to support the tube section which is then covered with reflectors.



2.3.6 Connect a length of radiant tube (F) to the end vent combustion chamber (A) by use of couplings (G), ensuring it is supported by the suspension support brackets (E).

NOTES: 1. The radiant tube should be installed with the seam weld facing upwards.

2. Ensure the radiant tube is installed in the horizontal or with a slight fall away from the end vent towards the fan.

A. Combustion Chamber - L101020-SUB; B. Suspension Lug; C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; E. Suspension Hanger - C110500-SUB (perimeter - C110501-SUB); F. Radiant Tube Ø100 - 1040; G. Tube Coupler - C112110 (Ø100); N. Combustion Chamber Reflector - L105050

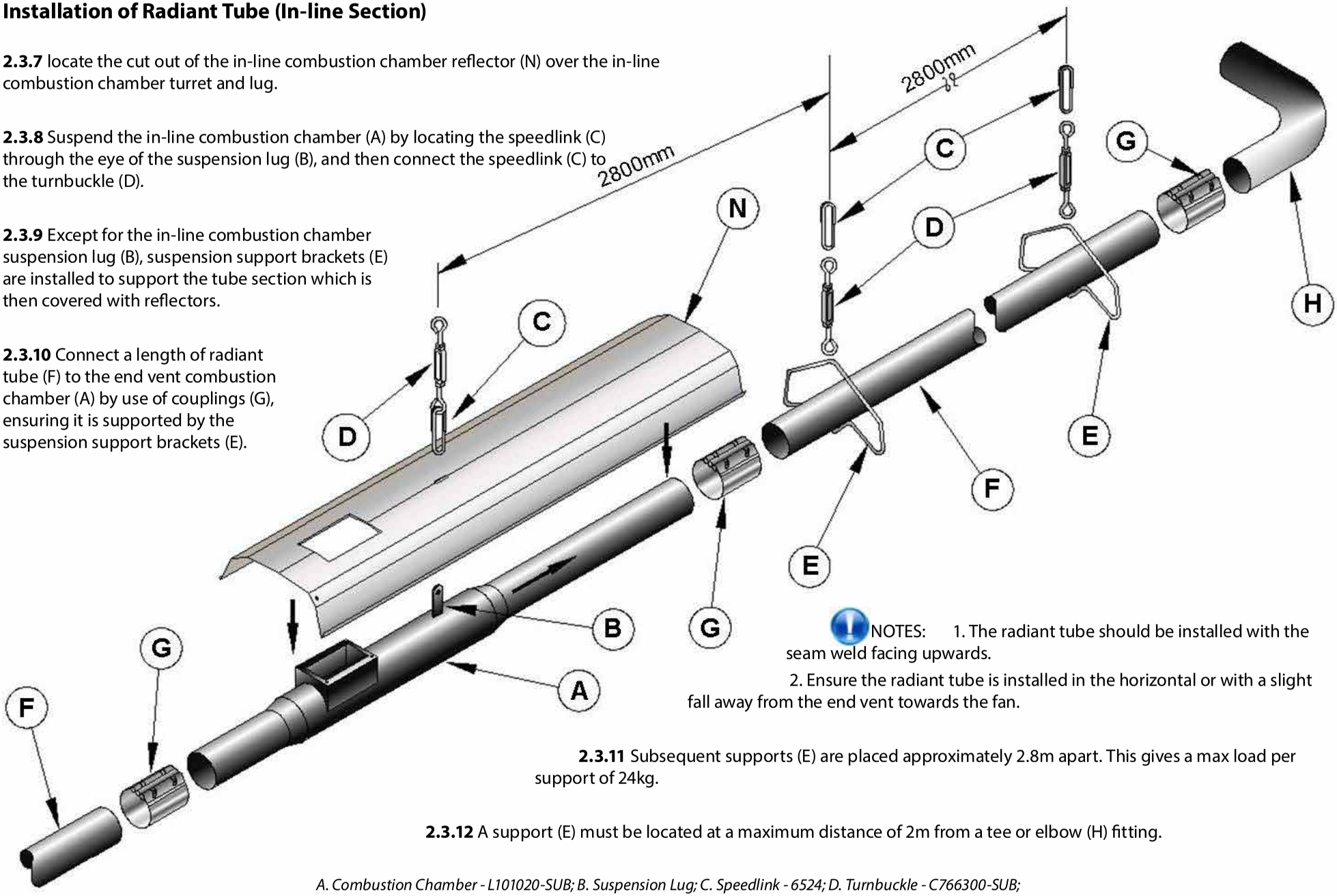
Installation of Radiant Tube (In-line Section)

2.3.7 locate the cut out of the in-line combustion chamber reflector (N) over the in-line combustion chamber turret and lug.

2.3.8 Suspend the in-line combustion chamber (A) by locating the speedlink (C) through the eye of the suspension lug (B), and then connect the speedlink (C) to the turnbuckle (D).

2.3.9 Except for the in-line combustion chamber suspension lug (B), suspension support brackets (E) are installed to support the tube section which is then covered with reflectors.

2.3.10 Connect a length of radiant tube (F) to the end vent combustion chamber (A) by use of couplings (G), ensuring it is supported by the suspension support brackets (E).



NOTES: 1. The radiant tube should be installed with the seam weld facing upwards.

2. Ensure the radiant tube is installed in the horizontal or with a slight fall away from the end vent towards the fan.

2.3.11 Subsequent supports (E) are placed approximately 2.8m apart. This gives a max load per support of 24kg.

2.3.12 A support (E) must be located at a maximum distance of 2m from a tee or elbow (H) fitting.

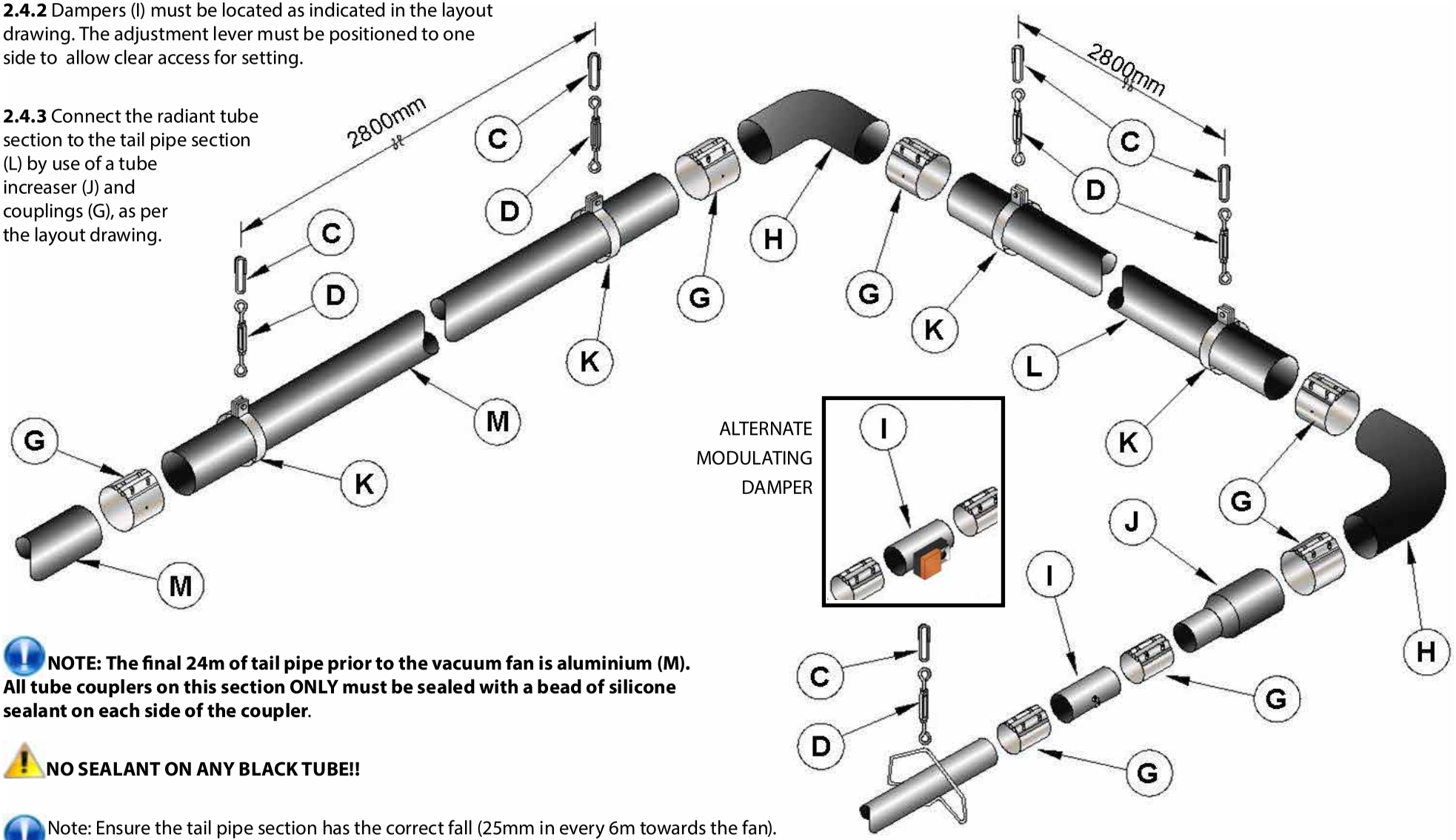
A. Combustion Chamber - L101020-SUB; B. Suspension Lug; C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; E. Suspension Hanger - C110500-SUB (perimeter - C110501-SUB); F. Radiant Tube Ø100 - 1040; G. Tube Coupler - C112110 (Ø100), H. 90° Bend - C112108 (black Ø100); N. Combustion Chamber Reflector - L105050.

2.4 Installation of Radiant tube to Tail Pipe

2.4.1 Tail pipe hangers (K) slung from turnbuckles (D) and Speedlinks (C) are installed to hang the manifold and tail pipe section which will be without reflectors.

2.4.2 Dampers (I) must be located as indicated in the layout drawing. The adjustment lever must be positioned to one side to allow clear access for setting.

2.4.3 Connect the radiant tube section to the tail pipe section (L) by use of a tube increaser (J) and couplings (G), as per the layout drawing.



NOTE: The final 24m of tail pipe prior to the vacuum fan is aluminium (M). All tube couplers on this section ONLY must be sealed with a bead of silicone sealant on each side of the coupler.

NO SEALANT ON ANY BLACK TUBE!!

Note: Ensure the tail pipe section has the correct fall (25mm in every 6m towards the fan).

C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; E. Suspension Hanger - C110500-SUB; G. Tube Coupler - C112110 (Ø100), C112120 (Ø150); H. 90° Bend - C112108 (black Ø100), C112109 (black Ø150), L101554 (Alum Ø150); I. Damper - C110241-SUB or alternate Modulating Damper Assembly - 202883; J. Increaser - C112117; K. Ø150 Tail Pipe Hanger - C112015; L. Ø150 Black Tail Pipe - C112126; M. Ø150 Alum Tail Pipe - 7230-3.

2.5 Installation of Main Reflectors

2.5.1 Install the first reflector bracket (P1) behind the turret of the combustion chamber (A).

2.5.2 Install the second reflector bracket (P2) 100mm from the other end of the combustion chamber reflector (N).

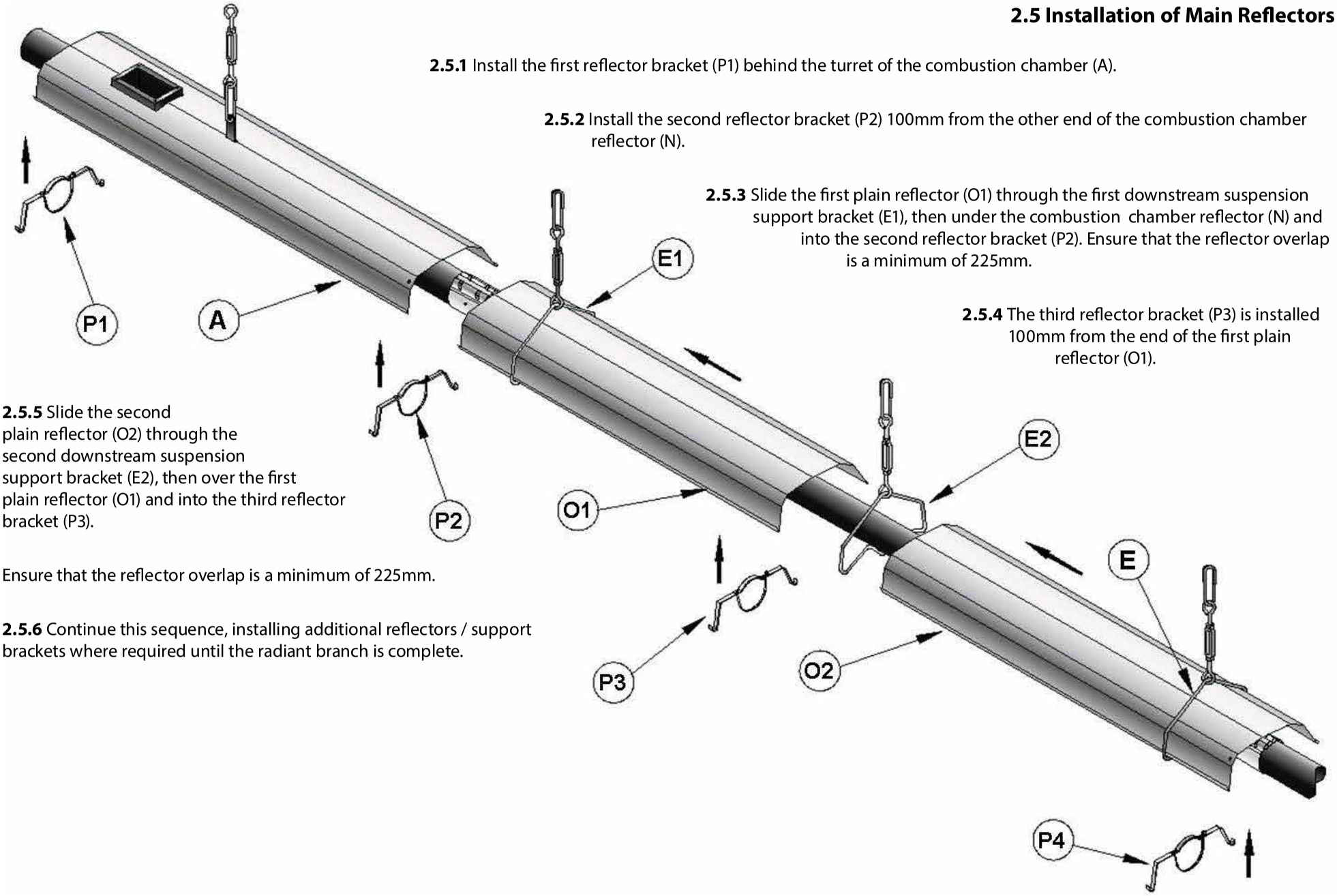
2.5.3 Slide the first plain reflector (O1) through the first downstream suspension support bracket (E1), then under the combustion chamber reflector (N) and into the second reflector bracket (P2). Ensure that the reflector overlap is a minimum of 225mm.

2.5.4 The third reflector bracket (P3) is installed 100mm from the end of the first plain reflector (O1).

2.5.5 Slide the second plain reflector (O2) through the second downstream suspension support bracket (E2), then over the first plain reflector (O1) and into the third reflector bracket (P3).

Ensure that the reflector overlap is a minimum of 225mm.

2.5.6 Continue this sequence, installing additional reflectors / support brackets where required until the radiant branch is complete.



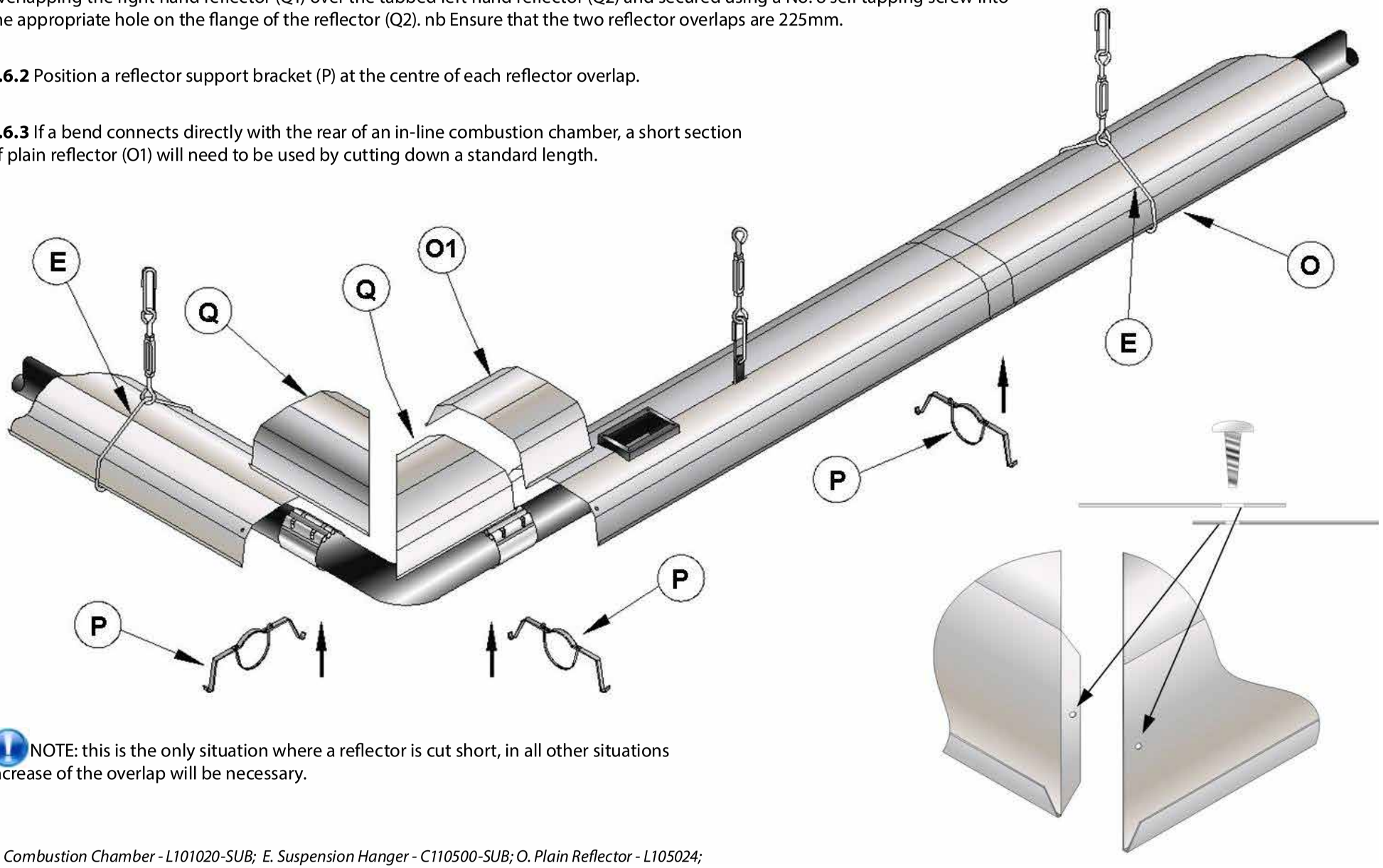
A. Combustion Chamber - L101020-SUB; E. Suspension Hanger - C110500-SUB; O. Plain Reflector - L105024; P. Reflector Support Bracket - L201008-SUB;

2.6 Installation of Corner Reflectors

2.6.1 The corner section must first be assembled by overlapping the right hand reflector (Q1) over the tabbed left hand reflector (Q2) and secured using a No. 8 self tapping screw into the appropriate hole on the flange of the reflector (Q2). nb Ensure that the two reflector overlaps are 225mm.

2.6.2 Position a reflector support bracket (P) at the centre of each reflector overlap.

2.6.3 If a bend connects directly with the rear of an in-line combustion chamber, a short section of plain reflector (O1) will need to be used by cutting down a standard length.



NOTE: this is the only situation where a reflector is cut short, in all other situations increase of the overlap will be necessary.

A. Combustion Chamber - L101020-SUB; E. Suspension Hanger - C110500-SUB; O. Plain Reflector - L105024; P. Reflector Support Bracket - L201008-SUB; Q. Corner Reflector Assembly - L105009-SUB

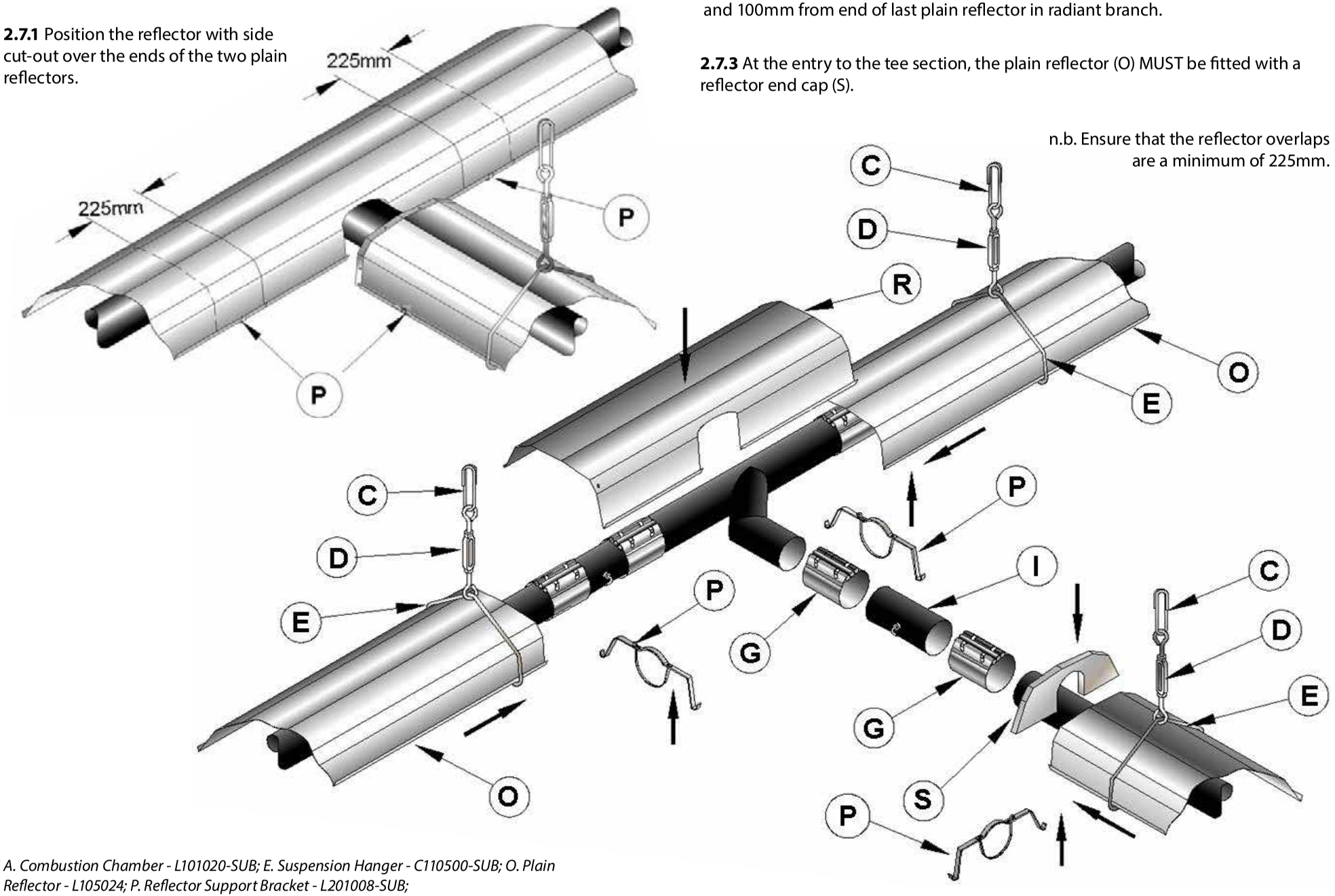
2.7 Installation of Tee Reflectors

2.7.1 Position the reflector with side cut-out over the ends of the two plain reflectors.

2.7.2 Position a reflector support bracket (P) at the centre of each reflector overlap and 100mm from end of last plain reflector in radiant branch.

2.7.3 At the entry to the tee section, the plain reflector (O) MUST be fitted with a reflector end cap (S).

n.b. Ensure that the reflector overlaps are a minimum of 225mm.



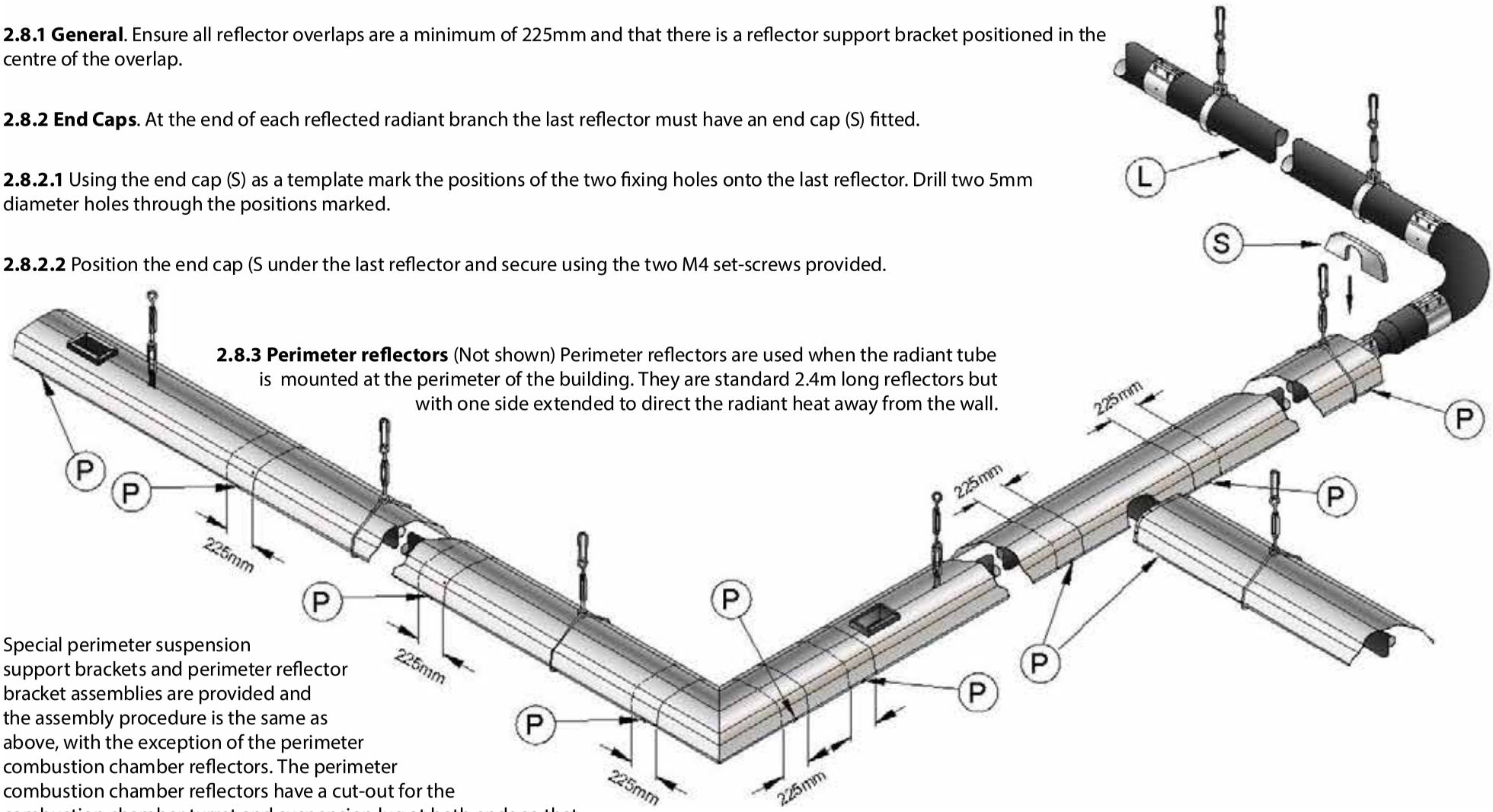
A. Combustion Chamber - L101020-SUB; E. Suspension Hanger - C110500-SUB; O. Plain Reflector - L105024; P. Reflector Support Bracket - L201008-SUB;

2.8.1 General. Ensure all reflector overlaps are a minimum of 225mm and that there is a reflector support bracket positioned in the centre of the overlap.

2.8.2 End Caps. At the end of each reflected radiant branch the last reflector must have an end cap (S) fitted.

2.8.2.1 Using the end cap (S) as a template mark the positions of the two fixing holes onto the last reflector. Drill two 5mm diameter holes through the positions marked.

2.8.2.2 Position the end cap (S under the last reflector and secure using the two M4 set-screws provided.



2.8.3 Perimeter reflectors (Not shown) Perimeter reflectors are used when the radiant tube is mounted at the perimeter of the building. They are standard 2.4m long reflectors but with one side extended to direct the radiant heat away from the wall.

Special perimeter suspension support brackets and perimeter reflector bracket assemblies are provided and the assembly procedure is the same as above, with the exception of the perimeter combustion chamber reflectors. The perimeter combustion chamber reflectors have a cut-out for the combustion chamber turret and suspension lug at both ends so that the one reflector can be used for either left or right hand perimeter systems.

Thus, the overlap of the perimeter combustion chamber reflector with the second perimeter reflector must be such that the cut-outs are adequately covered **ie. 1000mm overlap.**

L. Ø150 Mild Steel Tail Pipe - C112126; P. Reflector Support Bracket - L201008-SUB; S. End Cap - L105043;

2.9 Installation of Fan Exhaust System

2.9.1 Fan exhaust duct for vertical discharge

2.9.1.1 In vertical discharge, a tee piece (Wa) must be fitted in the exhaust ducting with a connection to drain from the cap (Wb) via a water filled U or P trap. A Non Return Valve **MUST NOT BE USED.**

All ducting must be sealed using silicone sealant to avoid condensate leaking to the outside of the ductwork.

Ensure that an adequate weatherproof seal such as a 'dektite' is made where the duct passes through the roof.

The flue terminal (Zb) is fitted by first applying silicone sealant around the connecting tube ends and then inserting the swaged end of the flue terminal into the 150mm diameter flue duct. The joint is secured by drilling through the tube and connector with 3 pop rivets at 12, 4 and 8 o'clock position. 3.5 mm (3/16 in) diameter pop rivets are recommended. (Not supplied by Nortek Global HVAC (UK) Limited).

2.9.1.2 The vacuum fan (Y) must be located as shown in the layout drawing and must have a bottom horizontal discharge.

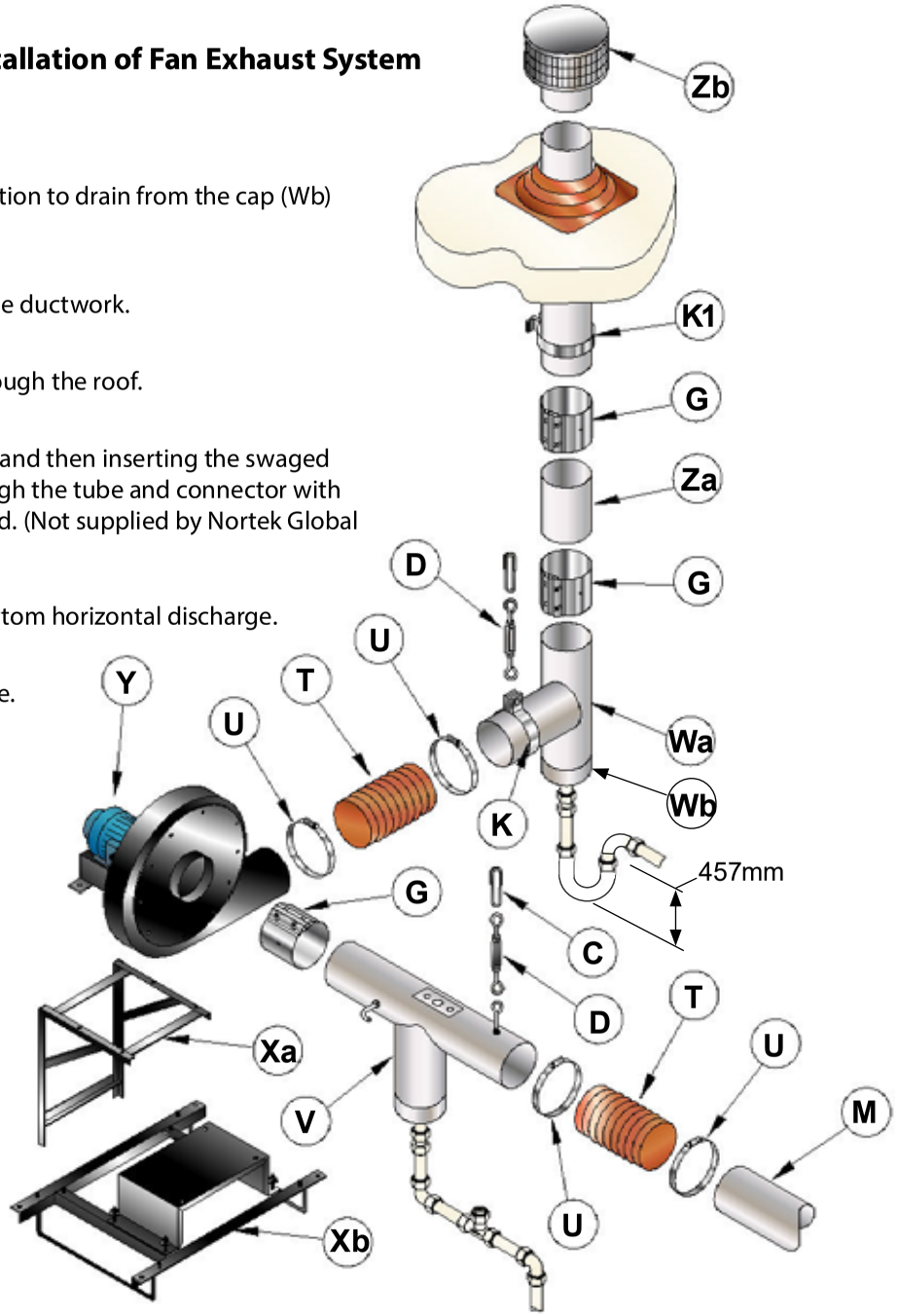
The fan can be fitted to the mounting platform (Xa) which is fixed to the wall or building structure. Alternatively, the fan can be suspended from the roof structure, via drop rods (not supplied) and mounted on base frame (Xb).

2.9.1.3 The system aluminium tail pipe (M) is connected via an expansion joint (T) to the 150 mm condensate trap assembly (V) and secured by jubilee clips (U) at each end.

A gap of approximately 150mm must be maintained between the condensate trap assembly (V) and the tail pipe (M).

2.9.1.4 The condensate trap assembly (V) must be supported using a turnbuckle (D) which is connected to the eye bolt by a speedlink (C) The condensate trap assembly (V) is connected to the 150mm diameter fan inlet connection via coupler (G).

Wall brackets (K1) should be fitted every 1.5m on vertical flue pipe.



C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; K. Tailpipe Support Bracket - C110215-SUB; K1. Wall Bracket - 31-51-316;
M. Ø150 Alum Tail Pipe - 7230-3; T. Expansion Joint - 7532; U. Jubilee Clip Ø150 - 7542; V. Condensate Trap Assembly - L101527-SUB; Wa. Tee Piece Ø150 - M201024; Wb. Cap - L101528; Xa. Fan Wall Mounting Platform - L103060; Xb. (alternate) Fan Base Frame; Y. Fan - refer table.9; Za. Ø150 Flue Pipe (1m lengths) - 202828; Zb. Flue Terminal - 202839

2.9.2 Fan exhaust duct for horizontal discharge

2.9.2.1 The exhaust flue duct (Za) must incline downwards away from the fan to avoid condensate running back into the fan. Flue couplers (G) are used to connect all exhaust duct fittings.

All flue ducting must be sealed using silicone sealant to avoid condensate leaking to the outside of the ductwork. A non-combustible sleeve (a) - not supplied by the Nortek Global HVAC (UK) Limited) must be fitted between the exhaust flue duct and the exit hole through the building wall.

The flue terminal (Zb) is fitted by first applying silicone sealant around the connecting tube ends and then inserting the swaged end of the flue terminal into the 150mm diameter flue duct. The joint is secured by drilling through the tube and connector with 3 pop rivets at 12, 4 and 8 o'clock position. 3.5 mm (3/16 in) diameter pop rivets are recommended. (Not supplied by Nortek Global HVAC (UK) Limited).

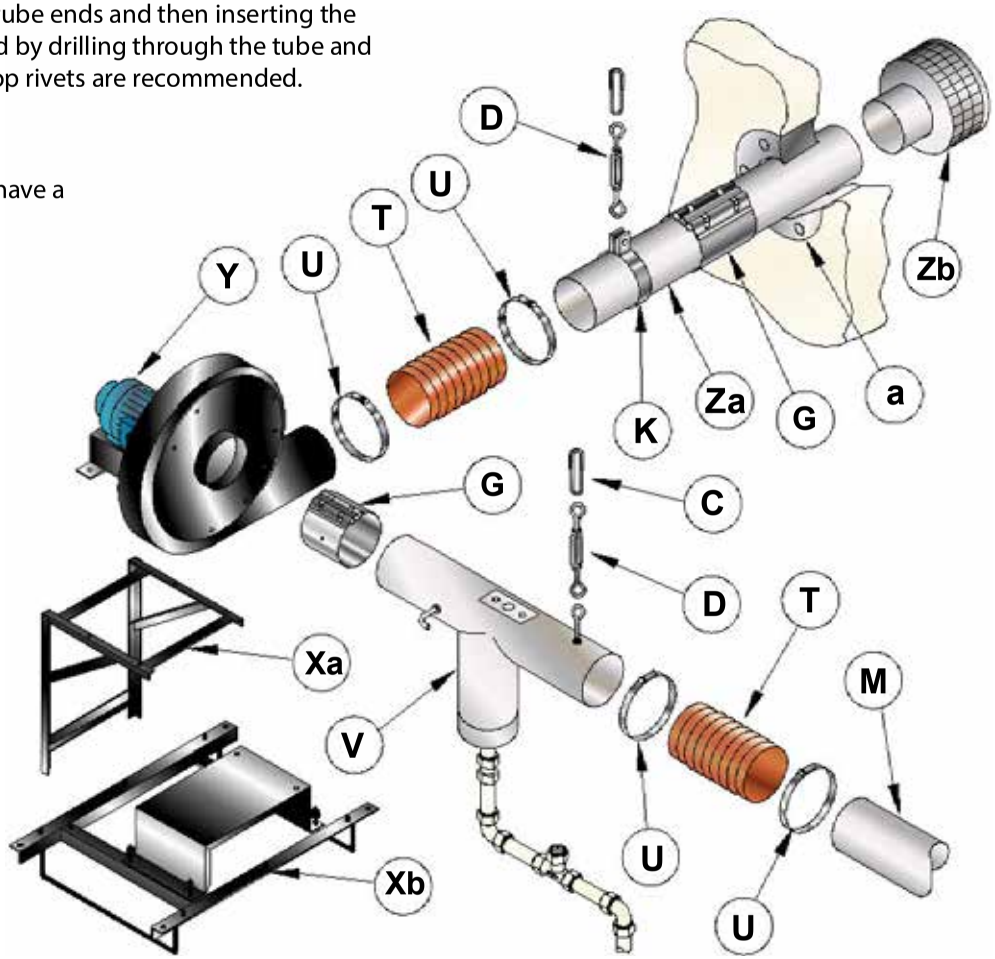
2.9.2.2 The vacuum fan (Y) must be located as shown in the layout drawing and must have a bottom horizontal discharge.

The fan can be fitted to the mounting platform (Xa) which is fixed to the wall or building structure. Alternatively, the fan can be suspended from the roof structure, via drop rods (not supplied) and mounted on base frame (Xb).

2.9.2.3 The system aluminium tail pipe (M) is connected via an expansion joint (T) to the 150 mm condensate trap assembly (V) and secured by jubilee clips (U) at each end.

A gap of approximately 150mm must be maintained between the condensate trap assembly (V) and the tail pipe (M).

2.9.2.4 The condensate trap assembly (V) must be supported using a turnbuckle (D) which is connected to the eye bolt by a speedlink (C) The condensate trap assembly (V) is connected to the 150mm diameter fan inlet connection via coupler (G).



C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; M. Ø150 Alum Tail Pipe - 7230-3; T. Expansion Joint - 7532; U. Jubilee Clip Ø150 - 7542; V. Condensate Trap Assembly - L101527-SUB; Xa. Fan Wall Mounting Platform - L103060; Xb. (alternate) Fan Base Frame; Y. Fan - refer table.9; Za. Ø150 Flue Pipe (1m lengths) - A791050; Zb. Flue Terminal - L101580-SUB; a. wall sleeve (not supplied).

2.9.3 Supplementary fan system setup for Modulating Fan Damper ONLY

Modulating fan dampers can be used in either vertical or horizontal discharge

2.9.3.1 The vacuum fan (Y) must be located as shown in the layout drawing and must have a bottom horizontal discharge.

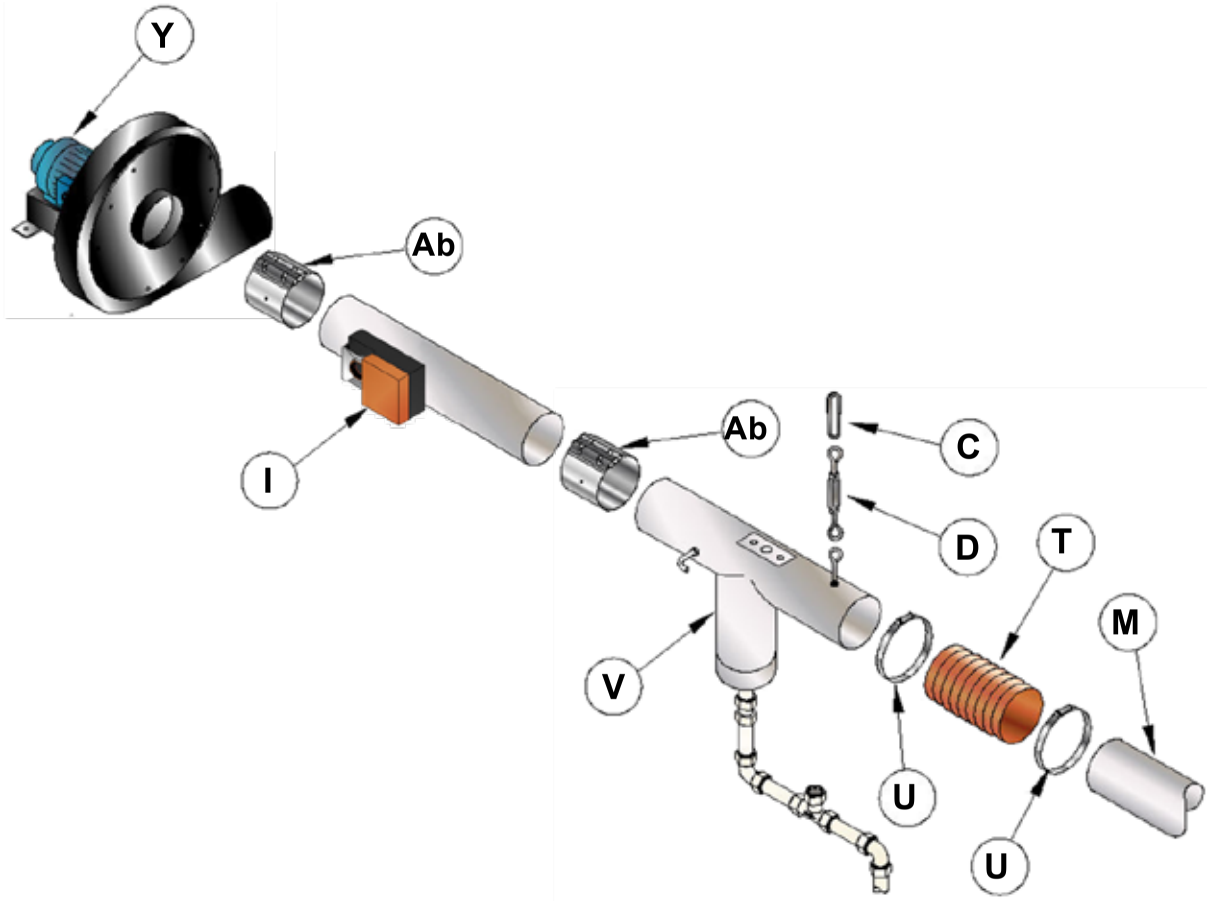
The fan can be fitted to the mounting platform (Xa) which is fixed to the wall or building structure. Alternatively, the fan can be suspended from the roof structure, via drop rods (not supplied) and mounted on base frame (Xb).

2.9.2.2 The system aluminium tail pipe (M) is connected via an expansion joint (T) to the 150 mm condensate trap assembly (V) and secured by jubilee clips (U) at each end.

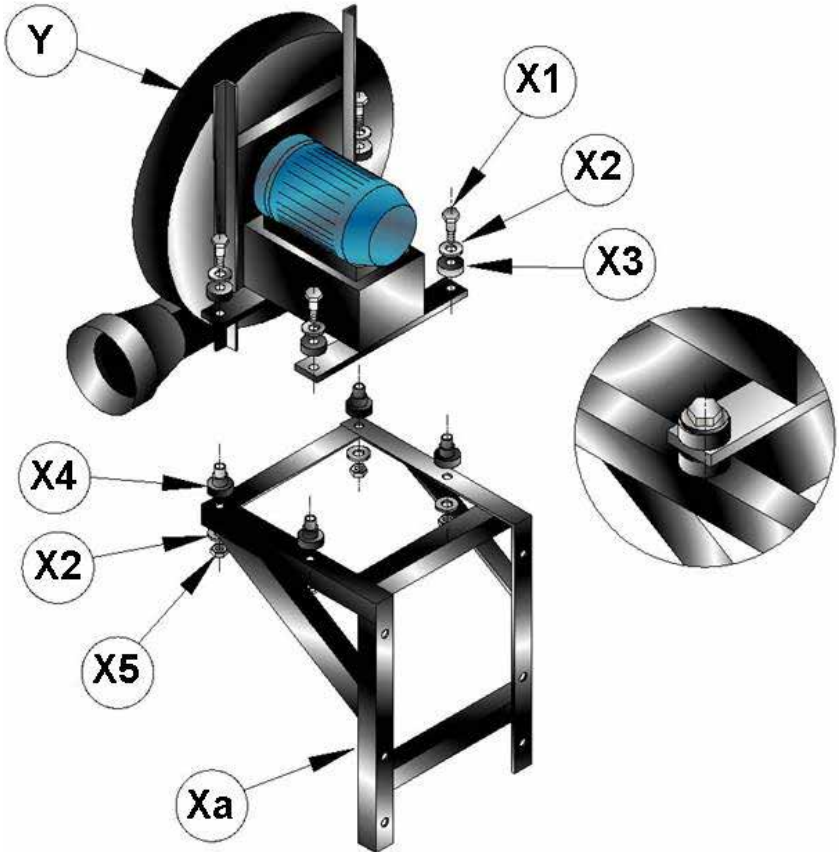
A gap of approximately 150mm must be maintained between the condensate trap assembly (V) and the tail pipe (M).

2.9.2.3 The condensate trap assembly (V) must be supported using a turnbuckle (D) which is connected to the eye bolt by a speedlink (C) The condensate trap assembly (V) is connected to the damper assembly (I) via a coupler (G).

2.9.2.4 The damper (I) must be located between the condensate trap assembly (V) and the 150mm diameter fan inlet connection via a coupler (G) (Y).



C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; I. 150mm Dia Modulating Damper Assembly - 202878; M. Ø150 Alum Tail Pipe - 7230-3; T. Expansion Joint - 7532; U. Jubilee Clip Ø150 - 7542; V. Condensate Trap Assembly - L101527-SUB; Y. Fan - refer table.9;



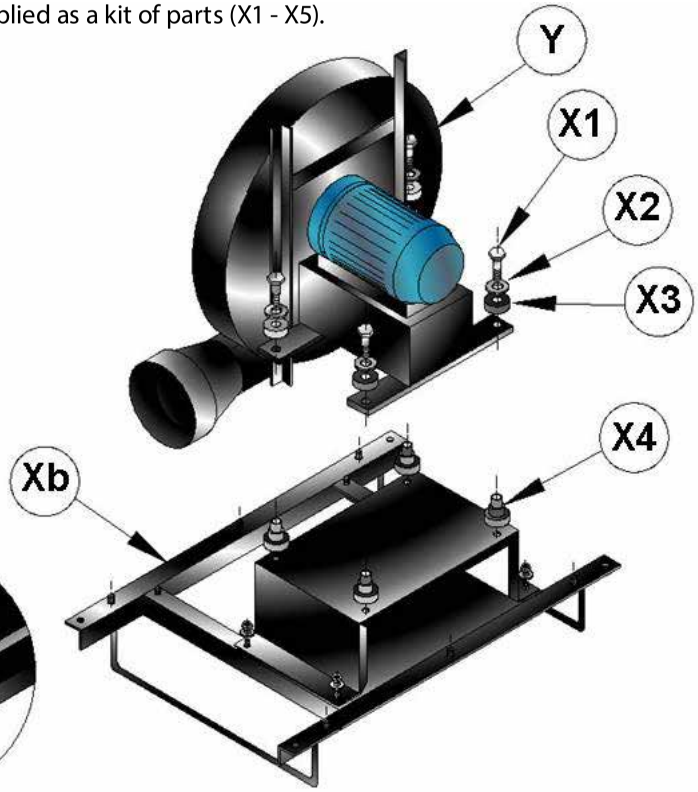
2.9.4 Fan Mounting

2.9.4.1 The vacuum fan (Y) must be located as shown in the layout drawing and must have a bottom horizontal discharge.

The fan should be fitted to a mounting platform (X) which is fixed to the wall or building structure. Mounting holes are pre drilled on the vertical legs of the platform.

Locate the mounting stool of the fan into position on the platform (Xa). Ensure anti-vibration mountings are used and secure in position.

Anti-vibration mountings are supplied as a kit of parts (X1 - X5).

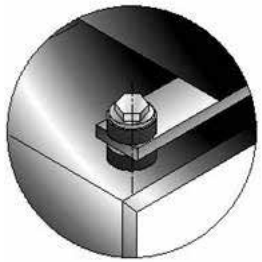


2.9.4.2 Alternatively, the fan can be suspended from a roof structure, via drop (not supplied) and mounted on base frame (Xb).

Locate the mounting stool of the fan into position on the frame (Xb).

Ensure anti-vibration mountings are used and secure in position.

X5 not used with base frame.



Xa. Fan Wall Mounting Platform - L103060; Xb. (alternate) Fan Base Frame; X1-5 Anti-vibration Mount Kit - L103045-SUB; Y. Fan - refer table.9;

2.9.5 Condensate Trap Assembly (for Condensate 'Tees' with manual damper handle)

The condensate trap assembly (V) is connected PRIOR to the 150mm diameter fan inlet connection via a coupler.

Ensure that a 1½ in (38 mm) drain tube assembly is fitted to the connection (V1) and to the non-return valve (V3) via bends (V2).

Ensure that the non-return valve (V3 - supplied) is fitted with the flow indication arrow pointing AWAY from the trap, in the HORIZONTAL position and at a vertical distance of 670mm* for BH type fans or 520mm* for B type fans, below the condensate trap assembly.

The condensate drainage pipe (V4 - not supplied) should be run in a standard drain pipe material, e.g. polyvinyl chloride (PVC), unplasticized polyvinyl chloride (PVC-U), ancrylonitrile-butadiene-styrene (ABS), polypropylene polyproene (PP) or cross-linked polyvinyl chloride (PVC-C). Copper or copper based alloy shall not be used for condensate drains. See BS 6896.

The drain tube must be resistant against the action of flue gas condensate and suitable for operation up to a maximum temperature of 50°C. Ensure that the drain tube is adequately supported.

All connecting drainage pipework should have a fall of at least 2.5° to the horizontal or approximately 50mm per metre of pipe run. If the drainage pipe has a run externally, it is recommended that the pipe is insulated to protect against frost.

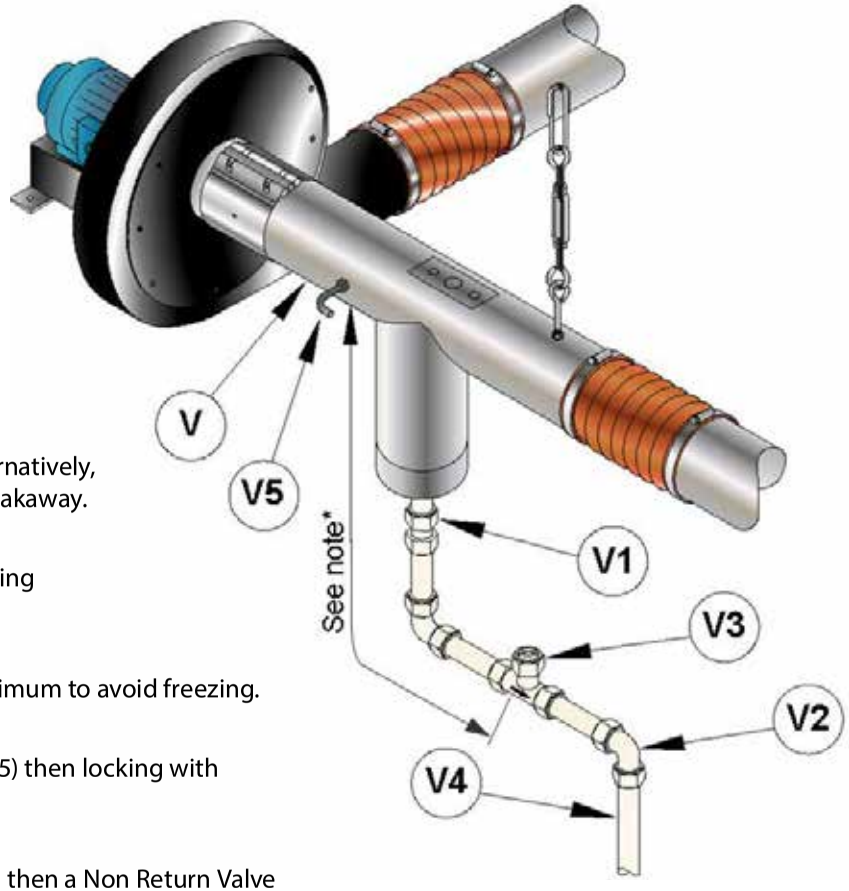
The condensate pipe should run and terminate internally to a soil and vent stack or a waste pipe. Alternatively, the condensate may be discharged into the combined foul storm water system or a purpose-made soakaway.

It should be noted that the connection of a condensate pipe to a drain might be subject to local building controls.

Any internal pipework should be of a diameter stated. Any external pipework should be kept to a minimum to avoid freezing.

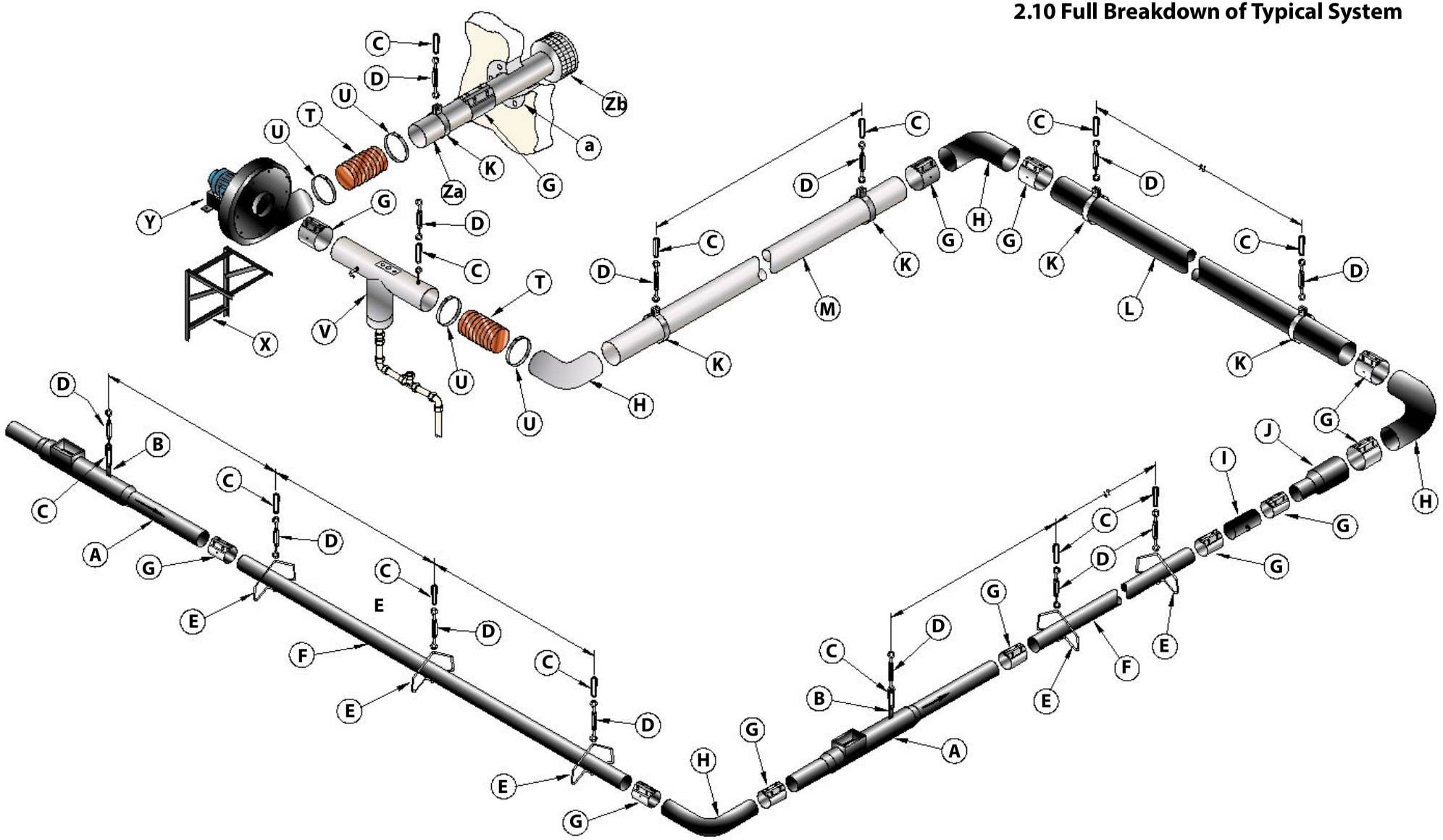
Damper to control the vacuum of the system during commissioning, is adjusted by rotating handle (V5) then locking with grub screw.

If subsequent condensate traps are installed after the fan outlet (i.e. in the case of a vertical discharge) then a Non Return Valve MUST NOT BE USED. Instead use a water filled U or P trap.



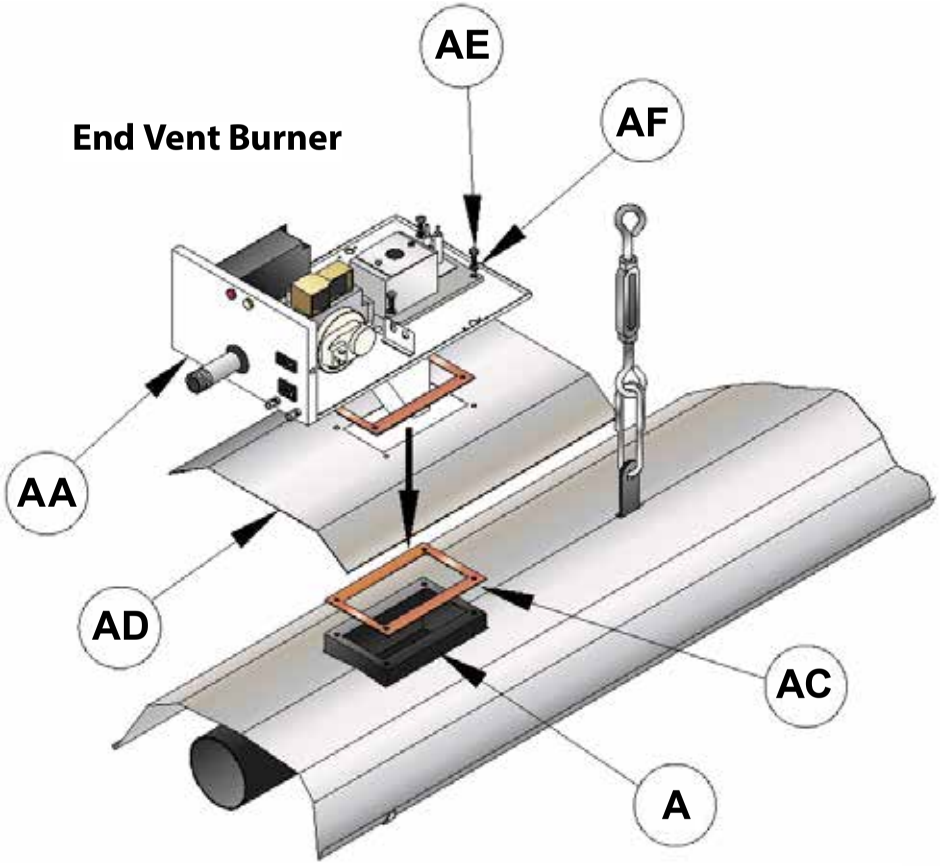
V. Condensate Trap Assembly - L101527-SUB; V1 - Tube Connector; V2. Drain Tube bends; V3. Non-return Valve; V4. Drain Tube; V5. Damper Handle

2.10 Full Breakdown of Typical System



A. Combustion Chamber - L101020-SUB; B. Suspension Lug; C. Speedlink - 6524; D. Turnbuckle - C766300-SUB; E. Suspension Hanger - C110500-SUB; F. Radiant Tube Ø100 - 1040; G. Tube Coupler - C112110 (Ø100), C112120 (Ø150); H. 90° Bend - C112108 (black Ø100), C112109 (black Ø150), L101554 (Alum Ø150); I. Damper - C110241-SUB or alternate Modulating Damper Assembly - 202883; J. Increaser - C112117; K. Ø150 Tail Pipe Hanger - C112015; L. Ø150 Black Tail Pipe - C112126; M. Ø150 Alum Tail Pipe - 7230-3; T. Expansion Joint - 7532; U. Jubilee Clip Ø150 - 7542; V. Condensate Trap Assembly - L101527-SUB; X. Fan Mounting Platform - L103060; Y. Fan - refer table.9; Za. Ø150 Flue Pipe (1m lengths) - A791050; Zb. Flue Terminal - L101580-SUB; a. Wall sleeve (not supplied).

2.11 Installation of End Vent and In Line Burners



2.11.1 Each burner is marked with its rated heat input, "EV" denotes end vent burner (AA), "IL" denotes inline burner (AB). The correct burner **MUST** be located as indicated on the site layout drawing.

If the difference between the two types is still unclear, the end vent burner has a pressure switch fitted inside and has two air pipe connectors located in the bottom right hand corner when looking at the rear of the unit.

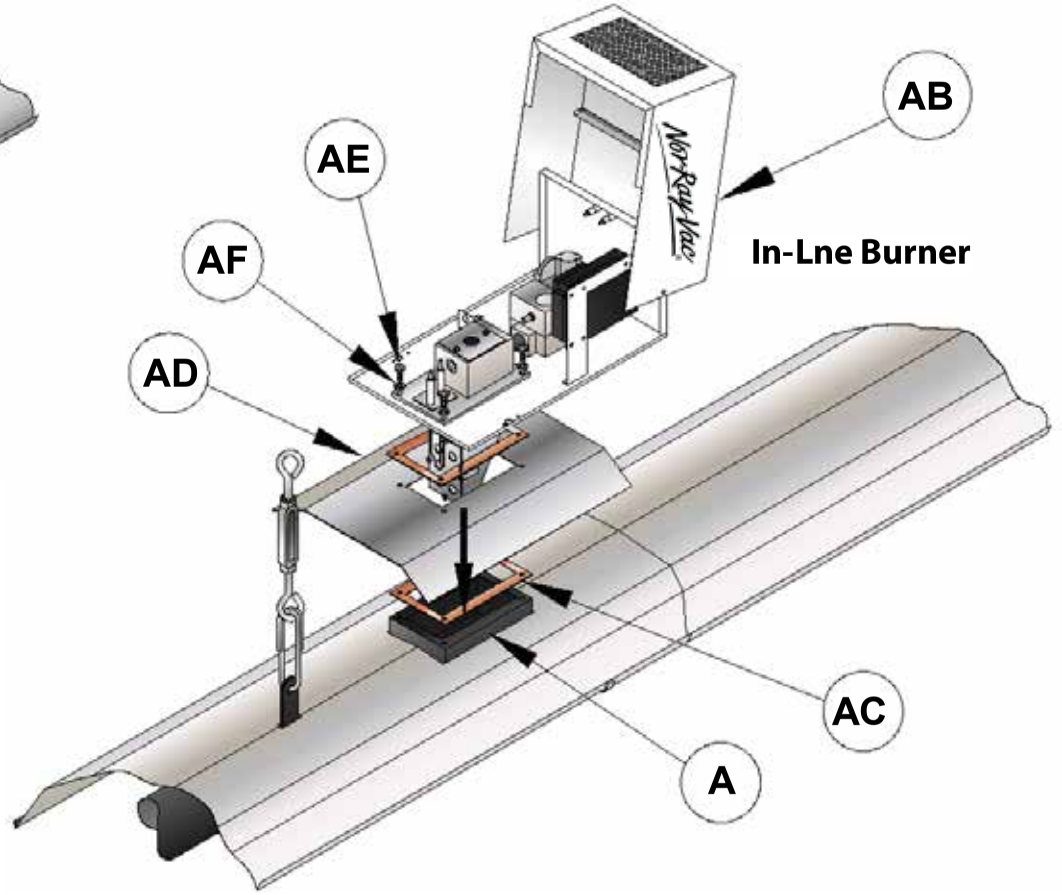
2.11.2 Position gasket (AC) on combustion chamber turret (A), in line with all four fixing holes.

2.11.3 Position heat shield (AD) on top of gasket (AC) in line with all four fixing holes of gasket and turret.

2.11.4 Fit each burner through heat shield (AD), gasket (AC) and turret. Square burner in line with all four fixing holes of gasket and turret.

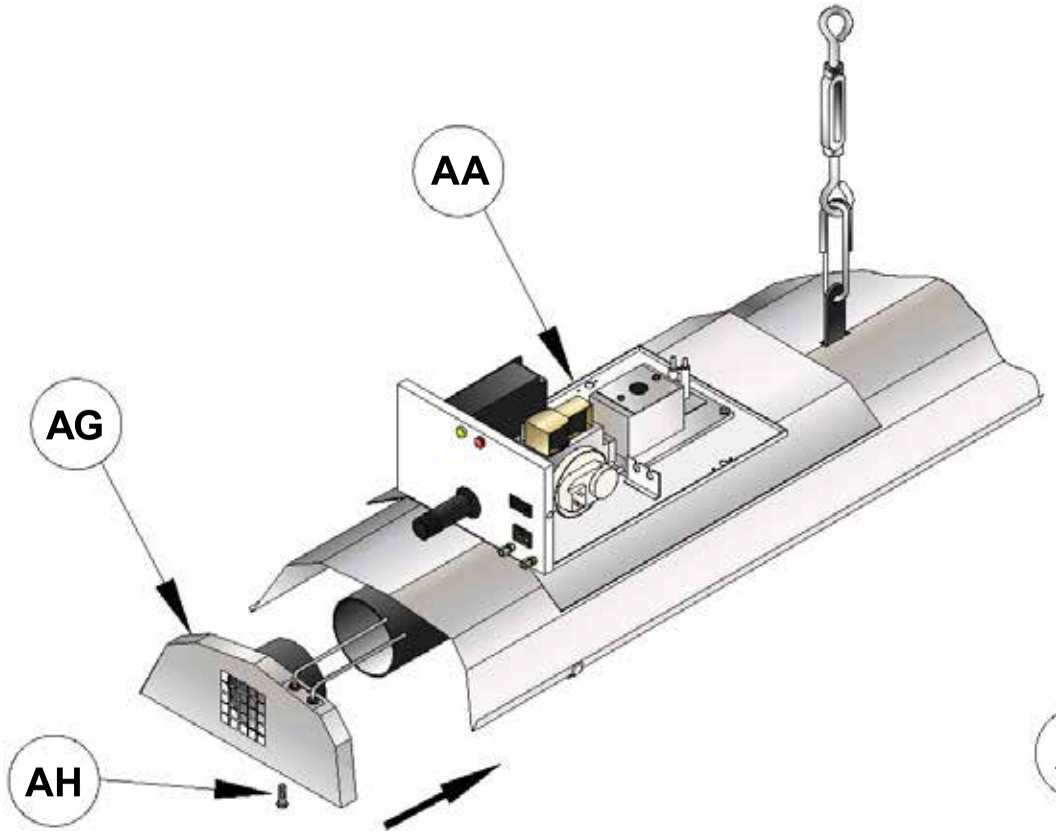
2.11.5 Secure the burner through the heat shield (AD) and gasket (AC) to the turret using the four M6 bolts (AE) and washers (AF) provided.

2.11.6 Repeat for all other end vent and inline burners



AA. End Vent Burner; AB. IL Burner; AC. Burner Gasket - L102032; AD. Burner Heat Shield - 200195; AE. 6mm Set Pin - 5429-1; AF. 6mm Washer - 5425

2.12 Installation of End Vent Module



2.12.1 An end vent module or 'EVM' (AG) is positioned at each end vent burner position.

Each end vent module must be fitted with the correct end vent orifice plate to suit the end vent burner.

An orifice or orifice plate attached inside the EVM support spinning is located on the air entry point of the EVM.

2.12.2 Slide the EVM support spinning over the end vent combustion chamber tube.

2.12.3 Ensure combustion chamber tube end butts positively against the orifice plate.

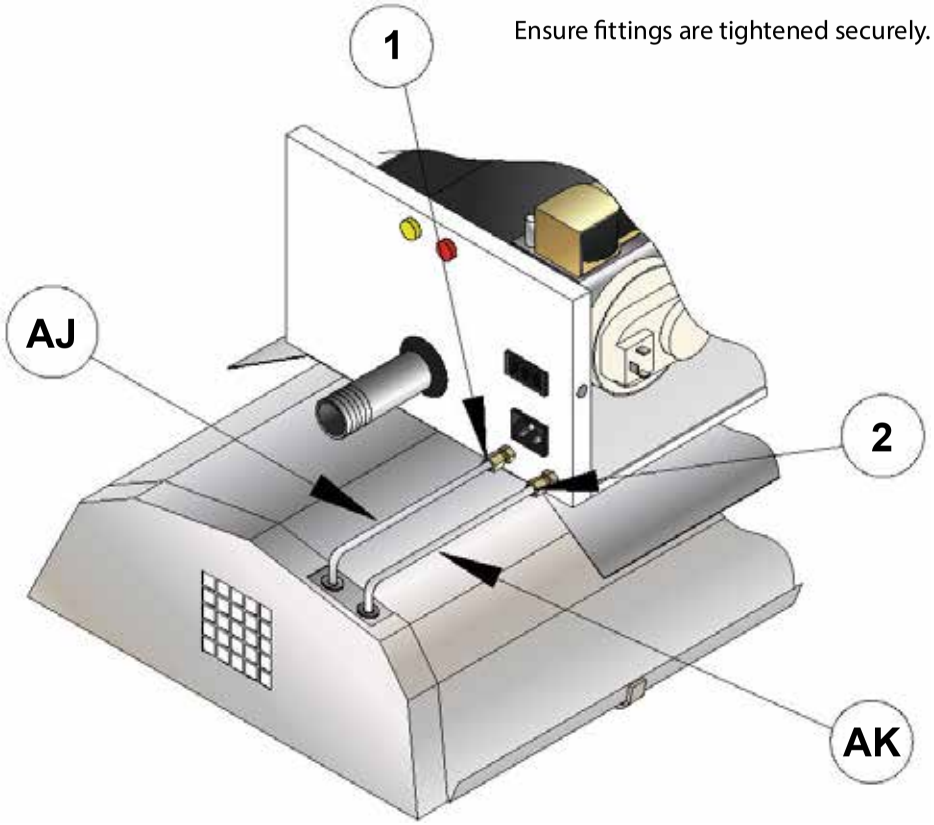
Secure using the M8 set pin (AH).

2.12.4 With the EVM (AG) in position on the end of the combustion chamber:

a attach the 'U' shaped bundy piece (AJ) to the compression fitting labeled '1'

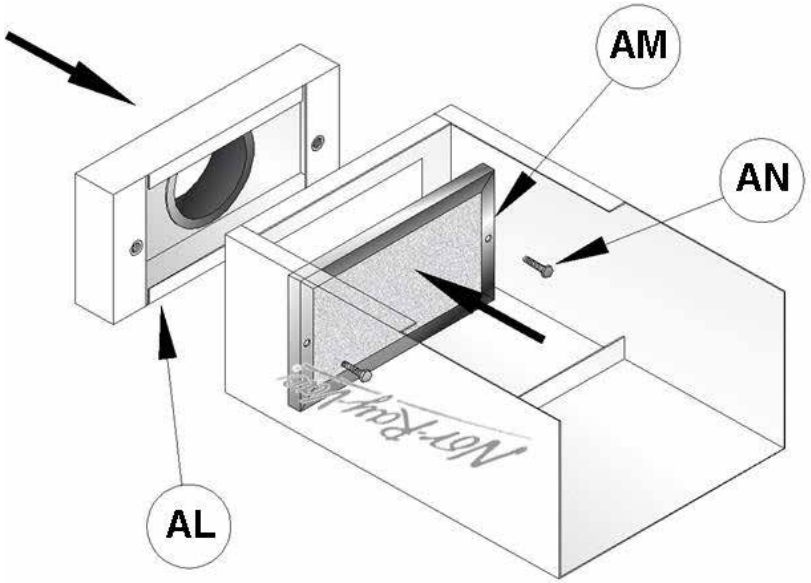
b attach the 'L' shaped bundy piece (AK) to the compression fitting labeled '2', positioned at the rear of the end vent burner (AA).

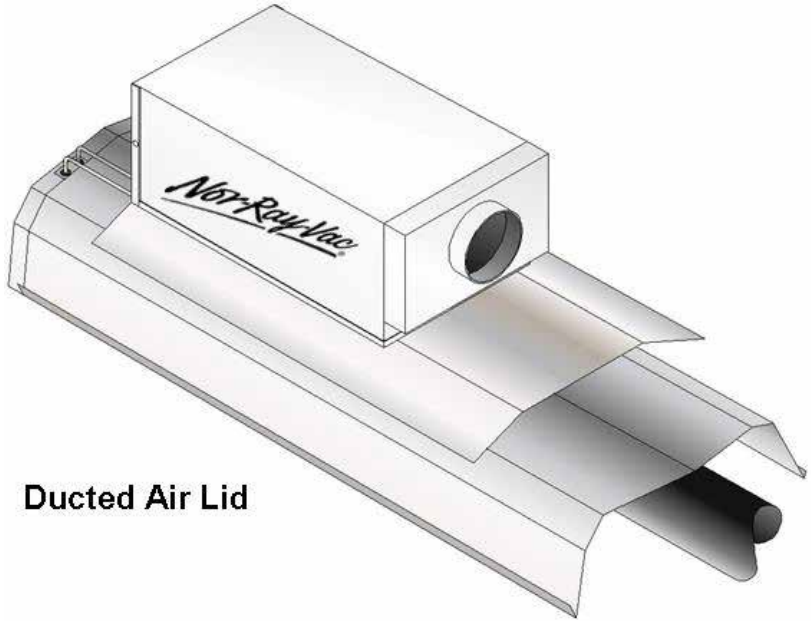
Ensure fittings are tightened securely.



AA. End Vent Burner; AG. End Vent Module; AH. M8 Set Pin - 5447; AJ. Air Tube 1 - L104053; AK. Air Tube 2 - L104054; 1. Compression fitting # 1; 2. Compression Fitting # 2

2.13 Installation of Ducted Air Adapters





2.13.1 Fitting ducted air adapter to burner assembly

The ducted air adapter (AL) is fitted over the air inlet position of the burner housing lid using two M5x30 set-screws (AN).

The primary air filter (AM) will remain in place inside the housing lid (A) via the same screws.

2.13.2 Fitting ducted air adapter to end vent module

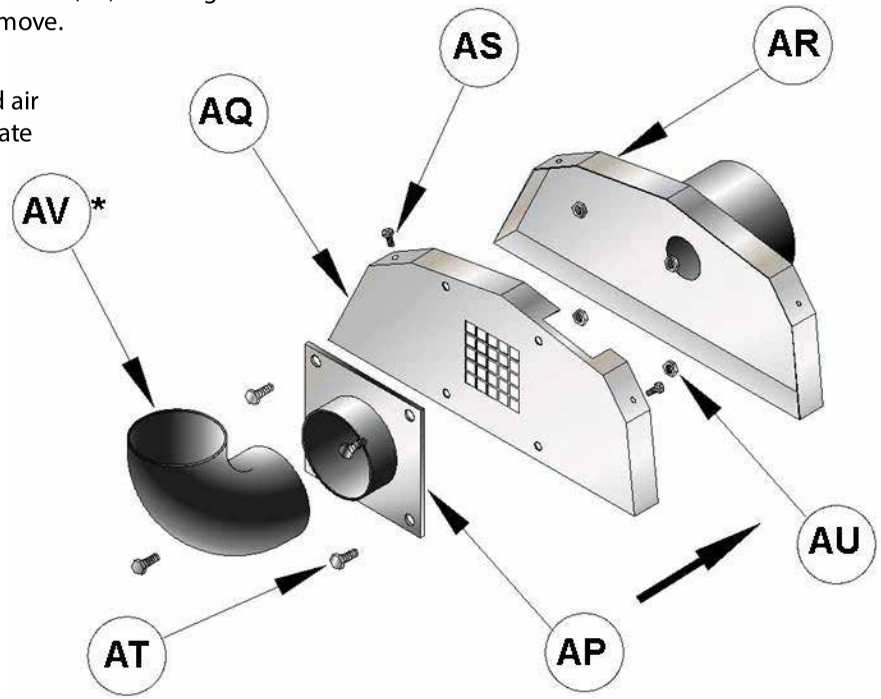
The ducted air adapter (AP) is fitted to the air inlet position of the EVM. To achieve this, the EVM has to be taken apart. Remove the EVM.

2.13.2.1Unscrew the fasteners (AS) securing the EVM outer plate (AQ) and remove.

2.13.2.2 Position ducted air adapter against inlet plate and secure using four M5 set screws (AT) washers and Nuts (AU) provided.

2.13.2.3 Reposition assembled plate onto the EVM inner plate (AR) and affix using screws (AS)

* Optional 90° elbow (AV) can be fitted to allow individual orientation.



AL. Burner Ducted Air Adapter - L104115; AM. Filter - L102013; AN. M5x30 Set screw; AP. EVM Ducted Air Adapter - L104122-SUB; AQ. EVM Outer Plate; AR. EVM Inner Plate; AS. EVM Fastener; AT. M5 Set Pin - 5369; AU. M5 Nut - 5350; AV. 90° Elbow - 7075-2

2.14 Installation of Ball Guard System

The Nor-Ray-Vac ballguard system consists of standard 2.44m long modules which are supported from the underside of the radiant tube. The ballguard sections are fitted in tandem along the system. Perimeter ballguards are installed in the same manor.

2.14.1 Installation

2.14.1.1 Starting at each system end vent, position the 'U' bolts (BB) around the radiant tube, through the clamp bridge (BC) and secure with M8 nuts (BE).

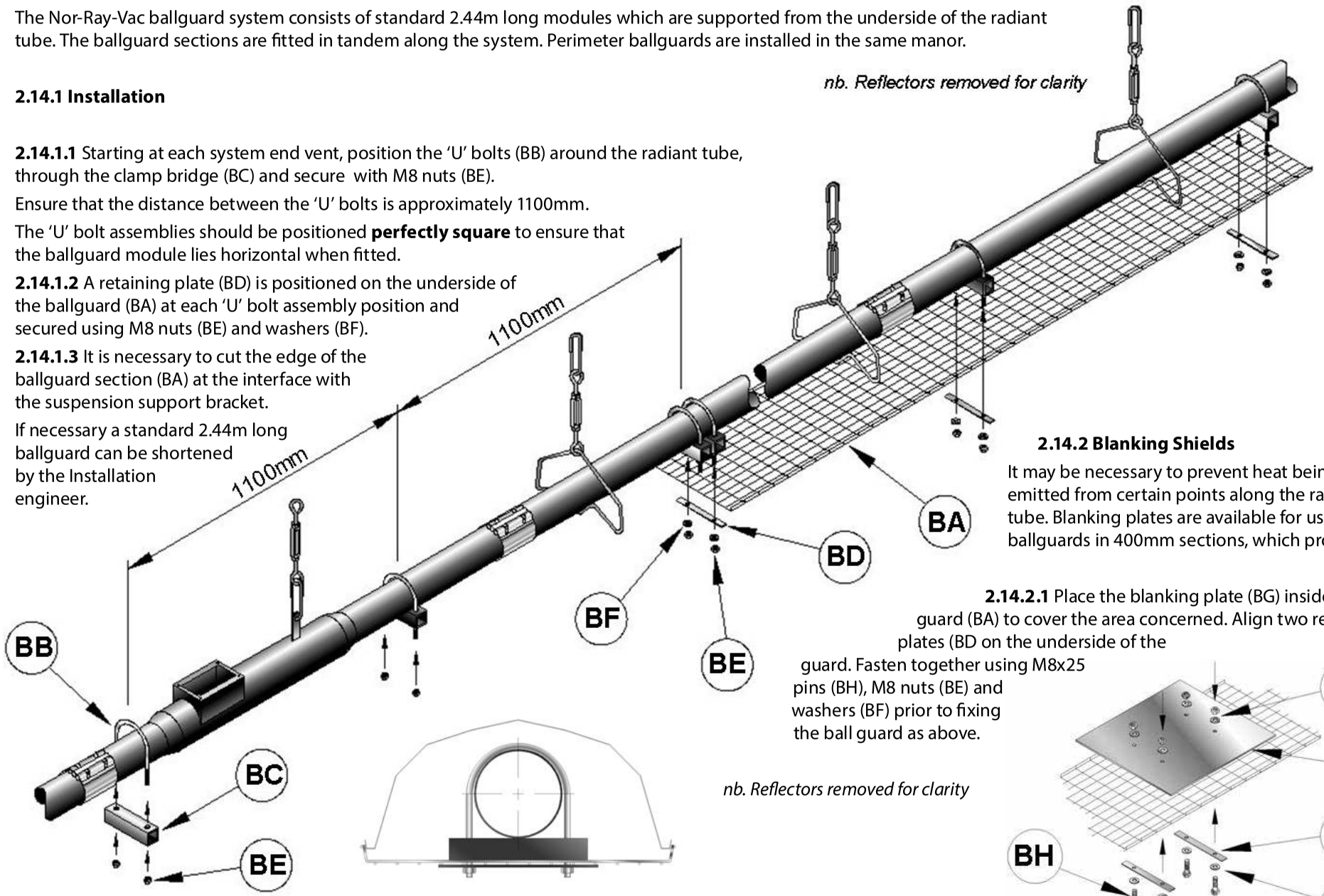
Ensure that the distance between the 'U' bolts is approximately 1100mm.

The 'U' bolt assemblies should be positioned **perfectly square** to ensure that the ballguard module lies horizontal when fitted.

2.14.1.2 A retaining plate (BD) is positioned on the underside of the ballguard (BA) at each 'U' bolt assembly position and secured using M8 nuts (BE) and washers (BF).

2.14.1.3 It is necessary to cut the edge of the ballguard section (BA) at the interface with the suspension support bracket.

If necessary a standard 2.44m long ballguard can be shortened by the Installation engineer.



nb. Reflectors removed for clarity

2.14.2 Blanking Shields

It may be necessary to prevent heat being directly emitted from certain points along the radiated tube. Blanking plates are available for use with ballguards in 400mm sections, which prohibit this.

2.14.2.1 Place the blanking plate (BG) inside the ball guard (BA) to cover the area concerned. Align two retaining plates (BD on the underside of the guard. Fasten together using M8x25 pins (BH), M8 nuts (BE) and washers (BF) prior to fixing the ball guard as above.

BA. 2.44M Ballguard - C110555; BB. 'U' Bolt - 5451; BC. Clamp Bracket - 3386; BD. Clamp Plate - C110449; BE. M8 Nut - 5441; BF. M8 Washer - 5445; BG. Blanking Shield - L106020; BH. M8 x 25 Set Pin - 5444

2.15 Installation of Slimline 'M' Decorative Grille System

The Slimline 'M' decorative grille system consists of standard 2.44m long modular grille assemblies which are supported from the underside of the radiant tube. The modular assemblies are fitted in tandem along the system.

2.15.1 Standard 2.44m long modular grille assemblies

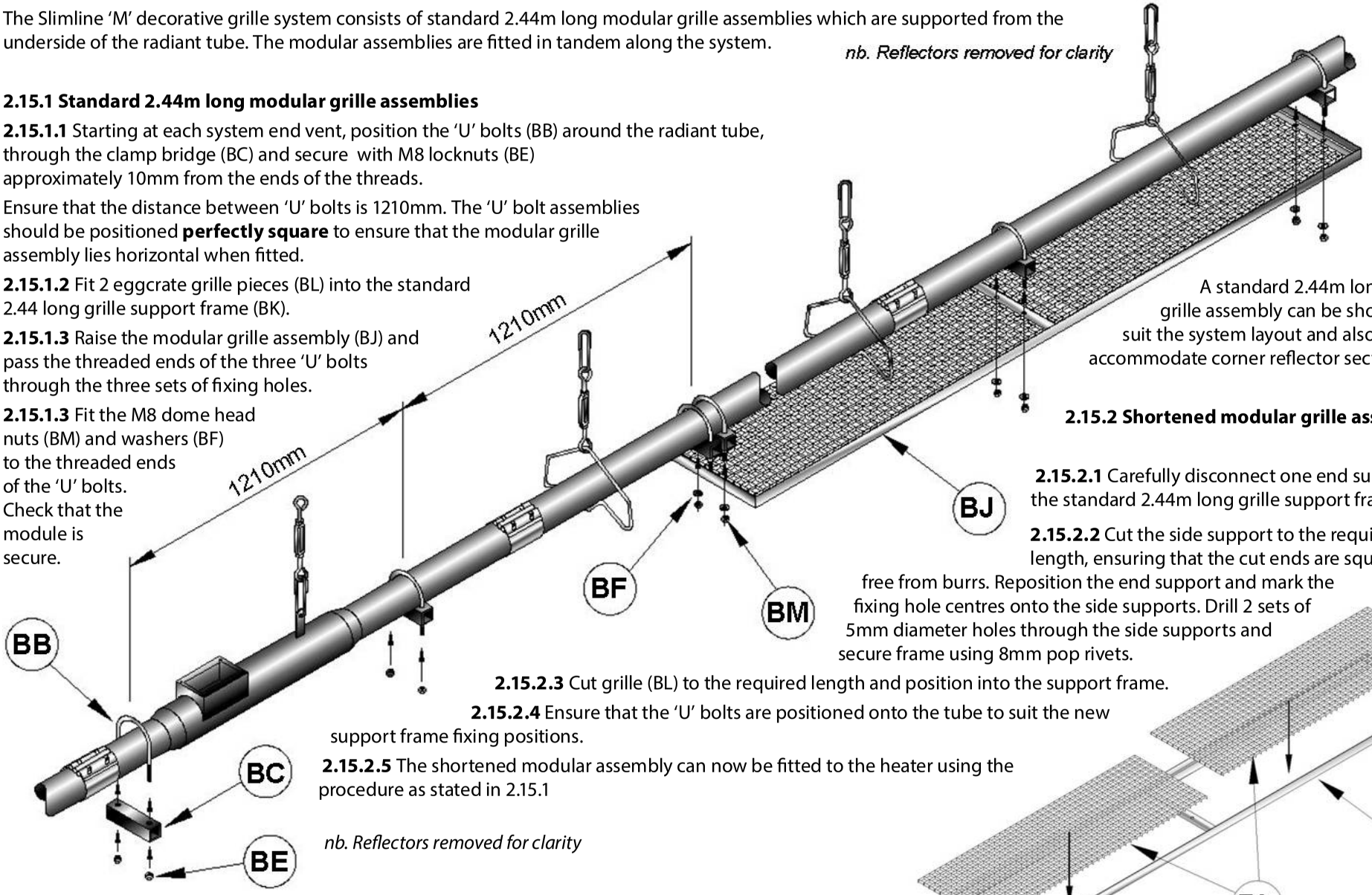
2.15.1.1 Starting at each system end vent, position the 'U' bolts (BB) around the radiant tube, through the clamp bridge (BC) and secure with M8 locknuts (BE) approximately 10mm from the ends of the threads.

Ensure that the distance between 'U' bolts is 1210mm. The 'U' bolt assemblies should be positioned **perfectly square** to ensure that the modular grille assembly lies horizontal when fitted.

2.15.1.2 Fit 2 eggcrate grille pieces (BL) into the standard 2.44 long grille support frame (BK).

2.15.1.3 Raise the modular grille assembly (BJ) and pass the threaded ends of the three 'U' bolts through the three sets of fixing holes.

2.15.1.3 Fit the M8 dome head nuts (BM) and washers (BF) to the threaded ends of the 'U' bolts. Check that the module is secure.



nb. Reflectors removed for clarity

A standard 2.44m long modular grille assembly can be shortened to suit the system layout and also to accommodate corner reflector sections.

2.15.2 Shortened modular grille assemblies.

2.15.2.1 Carefully disconnect one end support from the standard 2.44m long grille support frame (BK).

2.15.2.2 Cut the side support to the required length, ensuring that the cut ends are square and free from burrs. Reposition the end support and mark the fixing hole centres onto the side supports. Drill 2 sets of 5mm diameter holes through the side supports and secure frame using 8mm pop rivets.

2.15.2.3 Cut grille (BL) to the required length and position into the support frame.

2.15.2.4 Ensure that the 'U' bolts are positioned onto the tube to suit the new support frame fixing positions.

2.15.2.5 The shortened modular assembly can now be fitted to the heater using the procedure as stated in 2.15.1

BB. 'U' Bolt - L106006; BC. Clamp Bracket - 3386; BE. M8 Nut - 5441; BF. M8 Washer - 5445; BJ. Modular Grille Assembly - L106000-SUB; BK. Support Frame - L106004; BL. Eggcrate Grille - L106015; BM. M8 Dome Nuts - L106007

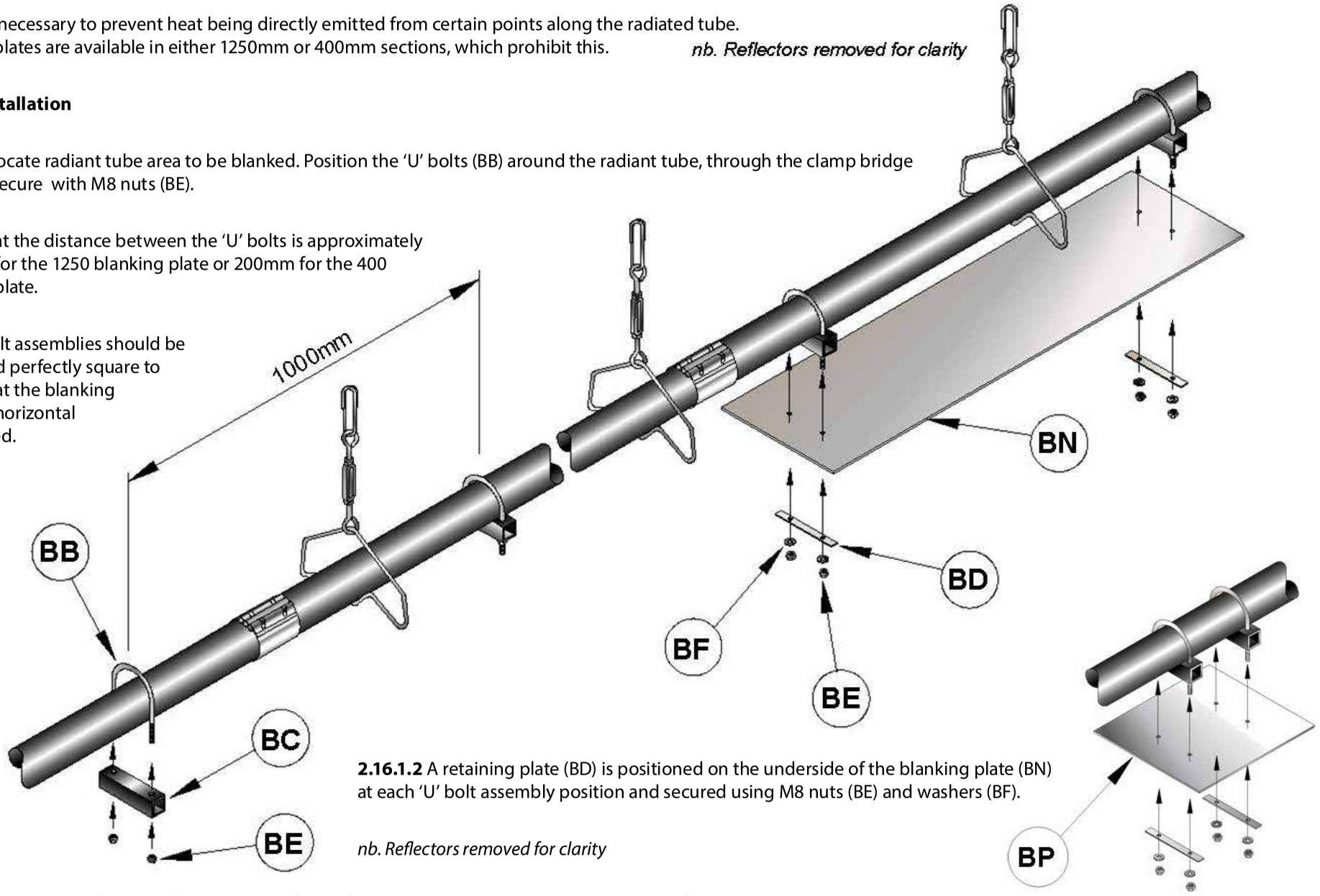
It may be necessary to prevent heat being directly emitted from certain points along the radiated tube.
Blanking plates are available in either 1250mm or 400mm sections, which prohibit this.

2.16.1 Installation

2.16.1.1 Locate radiant tube area to be blanked. Position the 'U' bolts (BB) around the radiant tube, through the clamp bridge (BC) and secure with M8 nuts (BE).

Ensure that the distance between the 'U' bolts is approximately 1000mm for the 1250 blanking plate or 200mm for the 400 blanking plate.

The 'U' bolt assemblies should be positioned perfectly square to ensure that the blanking plate lies horizontal when fitted.



2.16.1.2 A retaining plate (BD) is positioned on the underside of the blanking plate (BN) at each 'U' bolt assembly position and secured using M8 nuts (BE) and washers (BF).

nb. Reflectors removed for clarity

BB. 'U' Bolt - 5451; BC. Clamp Bracket - 3386; BD. Clamp Plate - C110449; BE. M8 Nut - 5441; BF. M8 Washer - 5445; BN. Blanking Shield 1250mm - L106020-1; BP. Alternative Blanking Shield 400mm - L106020

2.17 Installation of Undershield Deflectors

An Undersheld Deflector (BR) is positioned beneath the radiant tube, usually at the first half of the firing leg (nearest the burner), although this can be positioned at any point if being used purely as a heat deflector for clearance purposes.

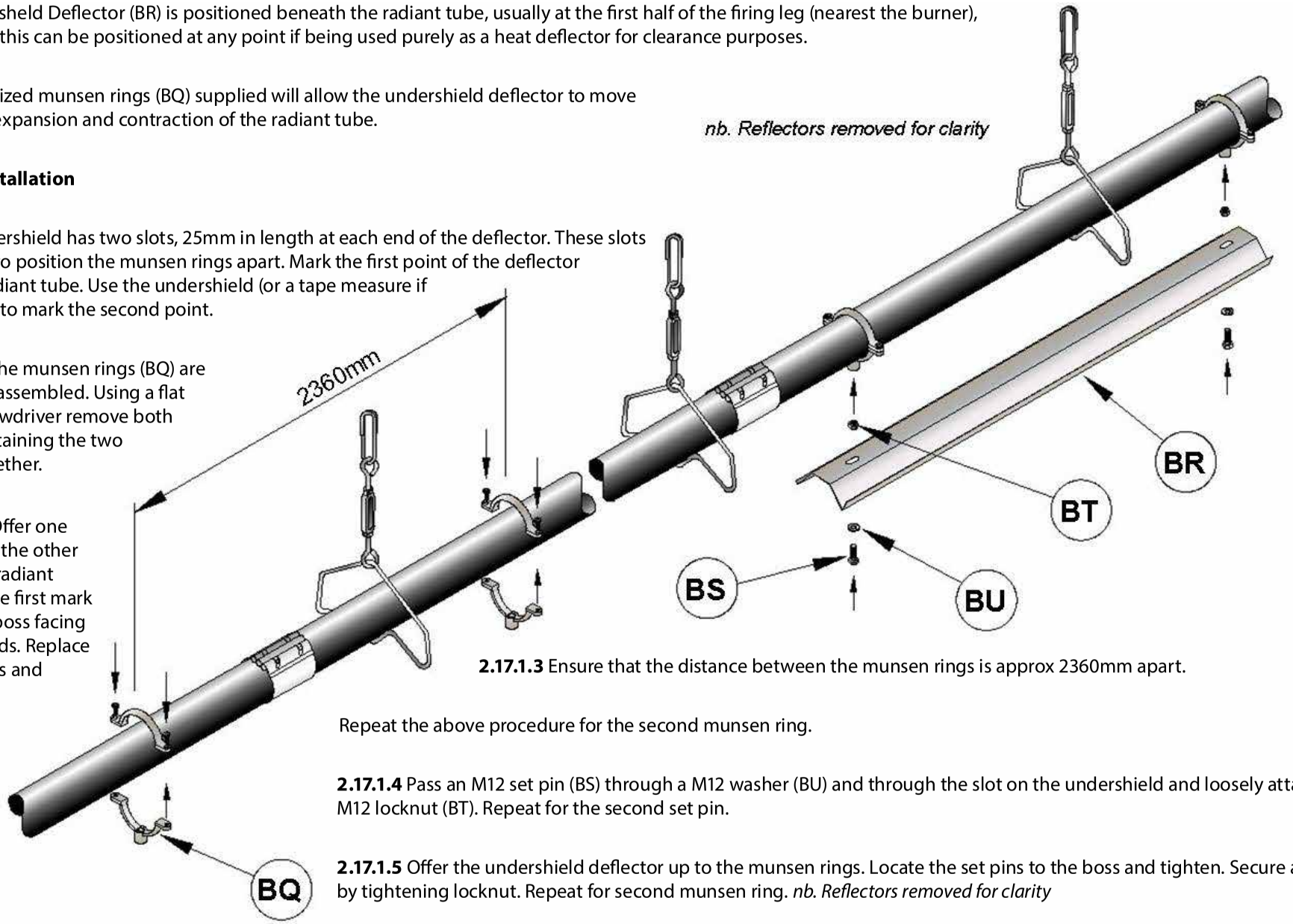
The oversized munsen rings (BQ) supplied will allow the undershield deflector to move with the expansion and contraction of the radiant tube.

2.17.1 Installation

Each undershield has two slots, 25mm in length at each end of the deflector. These slots are used to position the munsen rings apart. Mark the first point of the deflector on the radiant tube. Use the undershield (or a tape measure if required) to mark the second point.

2.17.1.1 The munsen rings (BQ) are supplied assembled. Using a flat head screwdriver remove both screws retaining the two parts together.

2.17.1.2 Offer one half, then the other onto the radiant tube at the first mark with the boss facing downwards. Replace the screws and tighten.



2.17.1.3 Ensure that the distance between the munsen rings is approx 2360mm apart.

Repeat the above procedure for the second munsen ring.

2.17.1.4 Pass an M12 set pin (BS) through a M12 washer (BU) and through the slot on the undershield and loosely attach the M12 locknut (BT). Repeat for the second set pin.

2.17.1.5 Offer the undershield deflector up to the munsen rings. Locate the set pins to the boss and tighten. Secure assembly by tightening locknut. Repeat for second munsen ring. *nb. Reflectors removed for clarity*

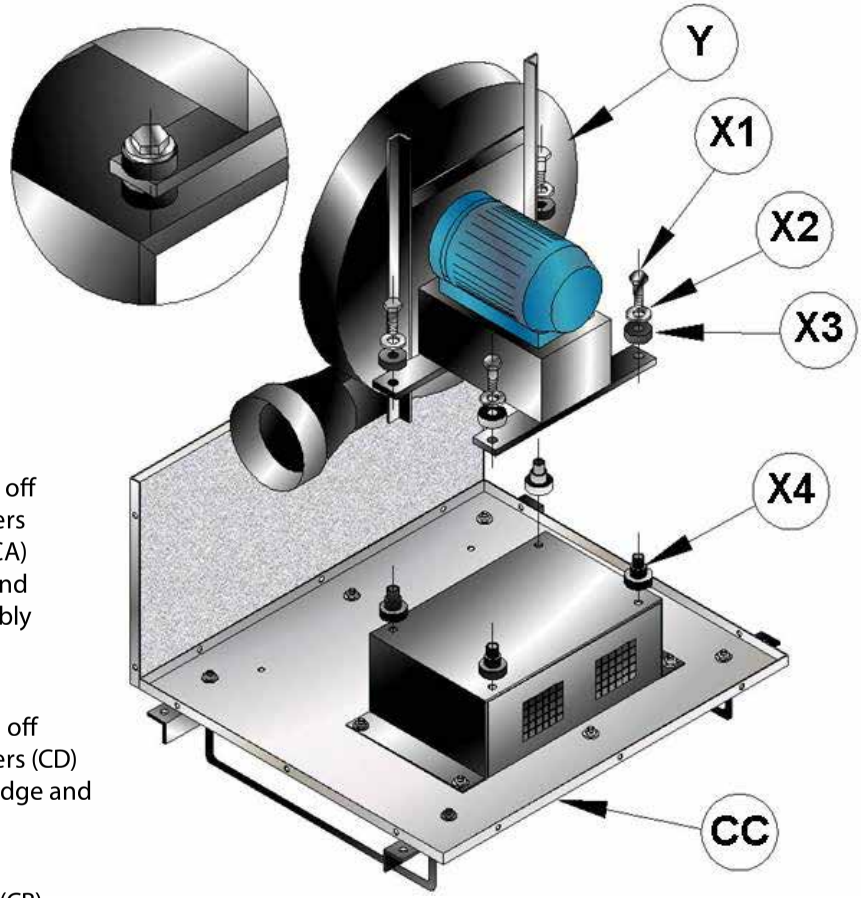
BQ. 100mm Munsen Rings - 6532; BR. Undershield 2440mm - 1350; BS. M12 x 50 Set Pin - 5501-1; BT. M12 Locknut - 5505

2.18 Installation of Acoustic Enclosure

The Nor-Ray-Vac Acoustic enclosure reduces the noise from the Vacuum fan where it is mounted inside the working area and noise is an issue. It is constructed of noise reducing panels assembled to form a cube. The acoustic enclosure is weatherproof and thus can be externally located.

2.18.1 Dis-assembly

The acoustic enclosure is delivered pre-assembled so some dismantling will be required to assemble the fan motor and flue.



2.18.1.1 Remove 15 off M6 bolts and washers (CD) along the lid (CA) edge as indicated and withdraw lid assembly (CA)

2.18.1.2 Remove 13 off M6 bolts and washers (CD) along the bottom edge and side as indicated.

Remove side panel (CB)

2.18.1.3 Locate fan assembly (Y) and position in correct orientation on fan stool located on base assembly (CC). Ensure anti-vibration mountings are used and secure using nuts and washers supplied.

Anti-vibration mountings are supplied as a kit of parts (X1 - X4).

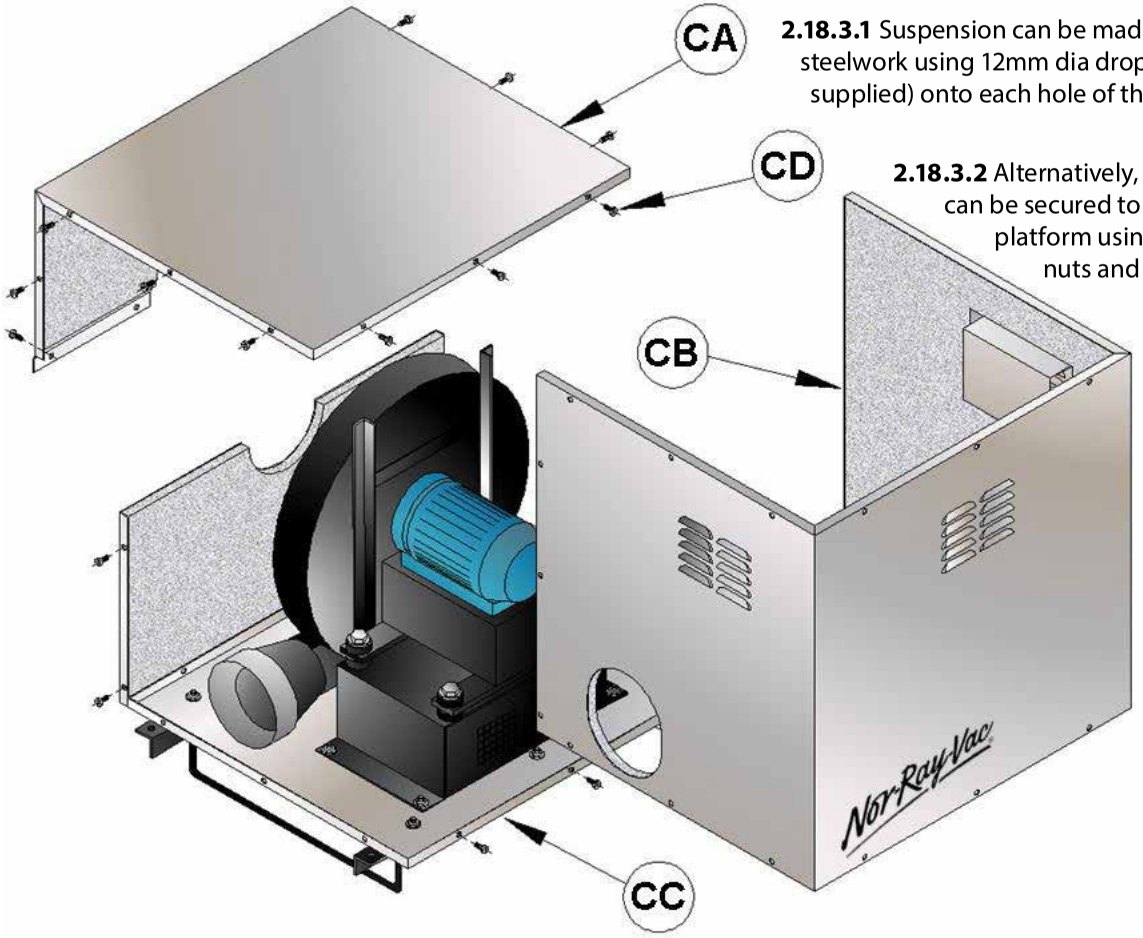
CA. Lid Assembly - 201117; CB. Side Panel Assembly - 201115; CC. Base Assembly - L103075-SUB; CD. M6 x 16 Bolts and Washers - 5416 & 5425; X1-4 Anti-vibration Mount Kit - L103045-SUB; Y. Fan;

2.18.2 Re-assemble

2.18.2.1 Replace side panel (CB). Refit 13 off M6 bolts and washers (CD) along the bottom edge and side as indicated.

2.18.2.2 Replace lid (CA). Refit 15 off M6 bolts and washers (CD) along the lid edge as indicated.

2.18.3 Suspension instructions for acoustic enclosure



2.18.3.1 Suspension can be made from building steelwork using 12mm dia drop-rods (not supplied) onto each hole of the base frame.

2.18.3.2 Alternatively, the base frame can be secured to suitable platform using M12 bolts, nuts and washers.

D6ims: (hwd)
736x760x670mm
Weight:
25.0kgs (excluding Fan)
Part: L103101-SUB

CA. Lid Assembly - 201117; CB. Side Panel Assembly - 201115; CC. Base Assembly - L103075-SUB; CD. M6 x 16 Bolts and Washers - 5416 & 5425; CE. 12MM All thread - (not supplied); CF. M12 Washers - (not supplied); CG. M12 Full Nuts - (not supplied)

2.19 Installation of the Flue Silencer

The Nor-Ray-Vac Flue Silencer reduces the external break-out noise from the flue terminal. This is essential for systems installed adjacent to residential and educational areas. It is constructed of noise reducing baffles assembled in an enclosure.

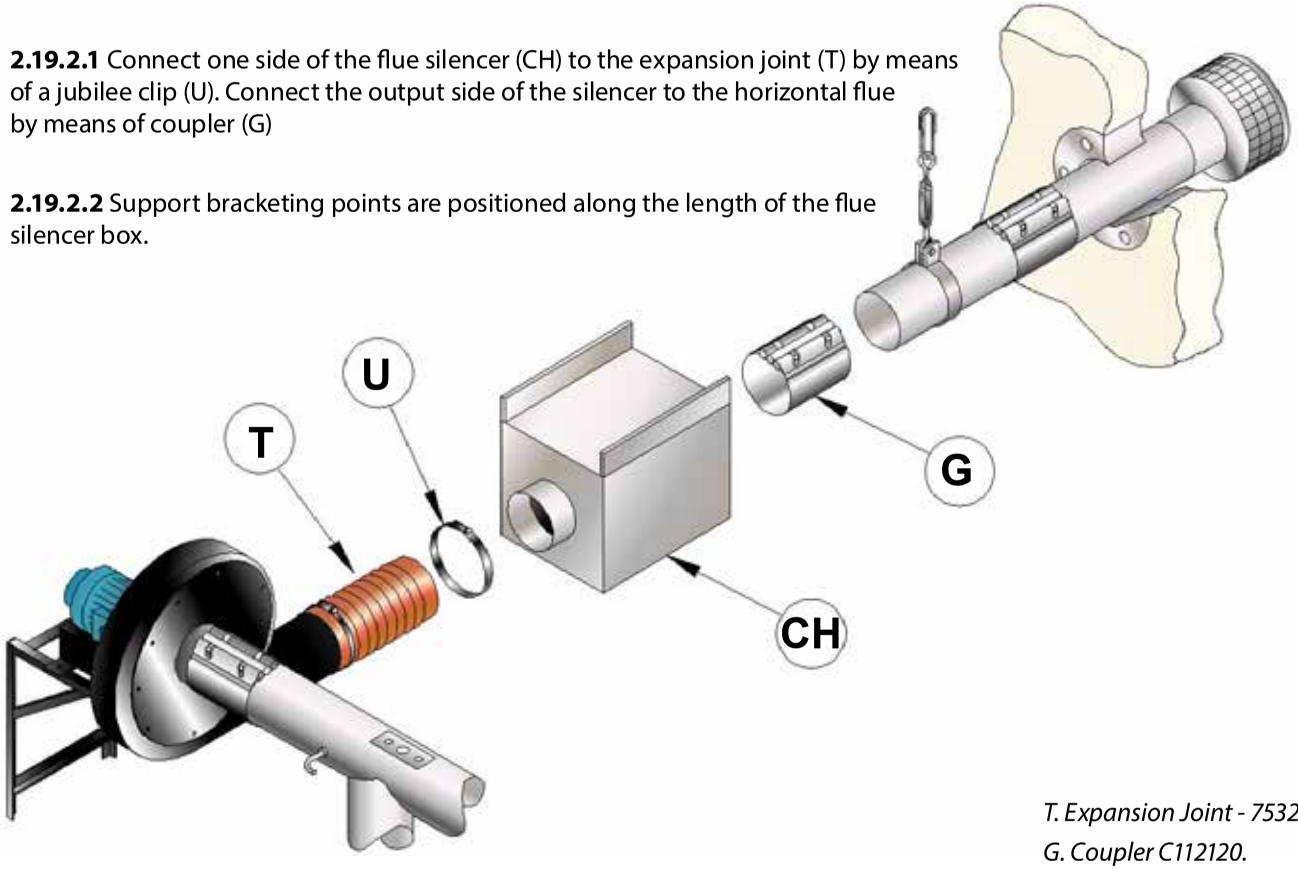
2.19.1 Assembly

The flue silencer box has 150mm diameter spigots at either end, and can be fitted into the fan discharge flue, utilising standard 150mm diameter connectors supplied.
The flue silencer (CH) can be fitted in the horizontal or vertical sections of the flue.

2.19.2 Horizontal configuration.

2.19.2.1 Connect one side of the flue silencer (CH) to the expansion joint (T) by means of a jubilee clip (U). Connect the output side of the silencer to the horizontal flue by means of coupler (G)

2.19.2.2 Support bracketing points are positioned along the length of the flue silencer box.



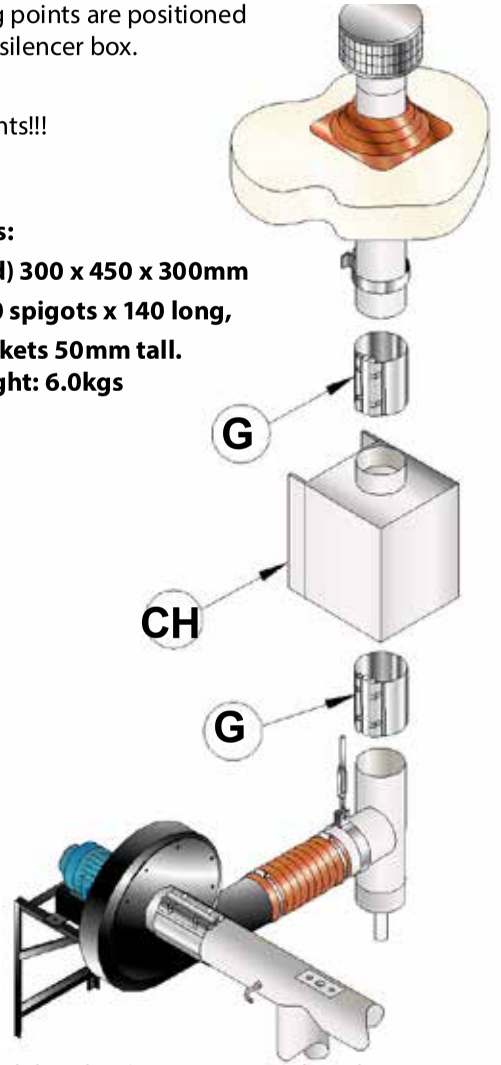
2.19.3 Vertical configuration.

2.19.3.1 Connect one side of the flue silencer (CH) to the condense tee using coupler(G) . Connect the output side of the silencer to the vertical flue using the other coupler (G).

2.19.3.2 Support bracketing points are positioned along the length of the flue silencer box.

Silicone sealant in all the joints!!!

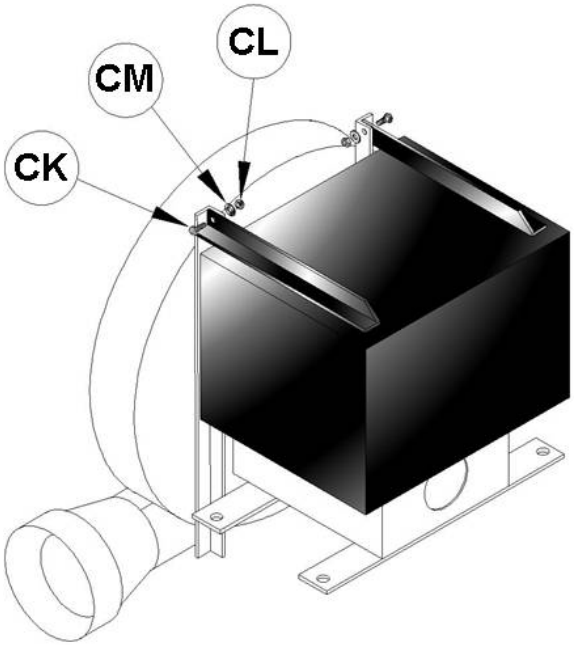
Dims:
(hwd) 300 x 450 x 300mm
ø150 spigots x 140 long,
brackets 50mm tall.
Weight: 6.0kgs



T. Expansion Joint - 7532; U. Jubilee Clip Ø150 - 7542; CH. Flue Silencer - A517360-SUB; G. Coupler C112120.

2.20 Installation of the Fan Motor Muff

The Nor-Ray-Vac Fan Motor Muff is ideal when the vacuum fan is mounted within a plant room or unused room to dampen down the fan motor noise. It is constructed of noise reducing panels assembled in an enclosure.

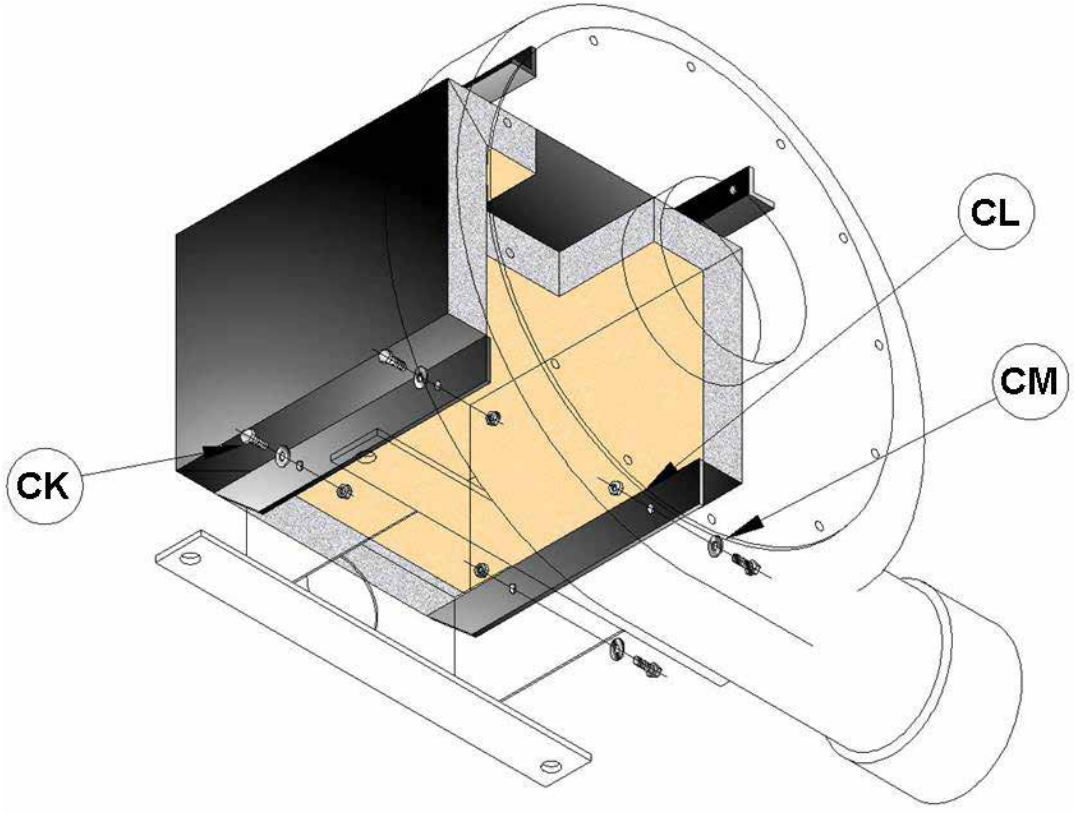


2.20.1 Assembly

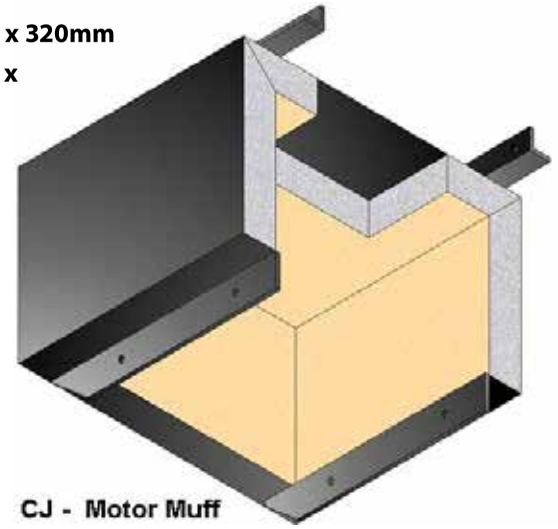
2.20.1.1 Fit the motor muff (CJ), over the motor of the vacuum fan.

2.20.1.2 Fix the muff to the fan motor stool using 4 bolts (CK), nuts (CL) and washers (CM) as indicated.

2.20.1.3 Fix the muff to the fan back bracket using 2 bolts (CK), nuts (CL) and washers (CM) as indicated.



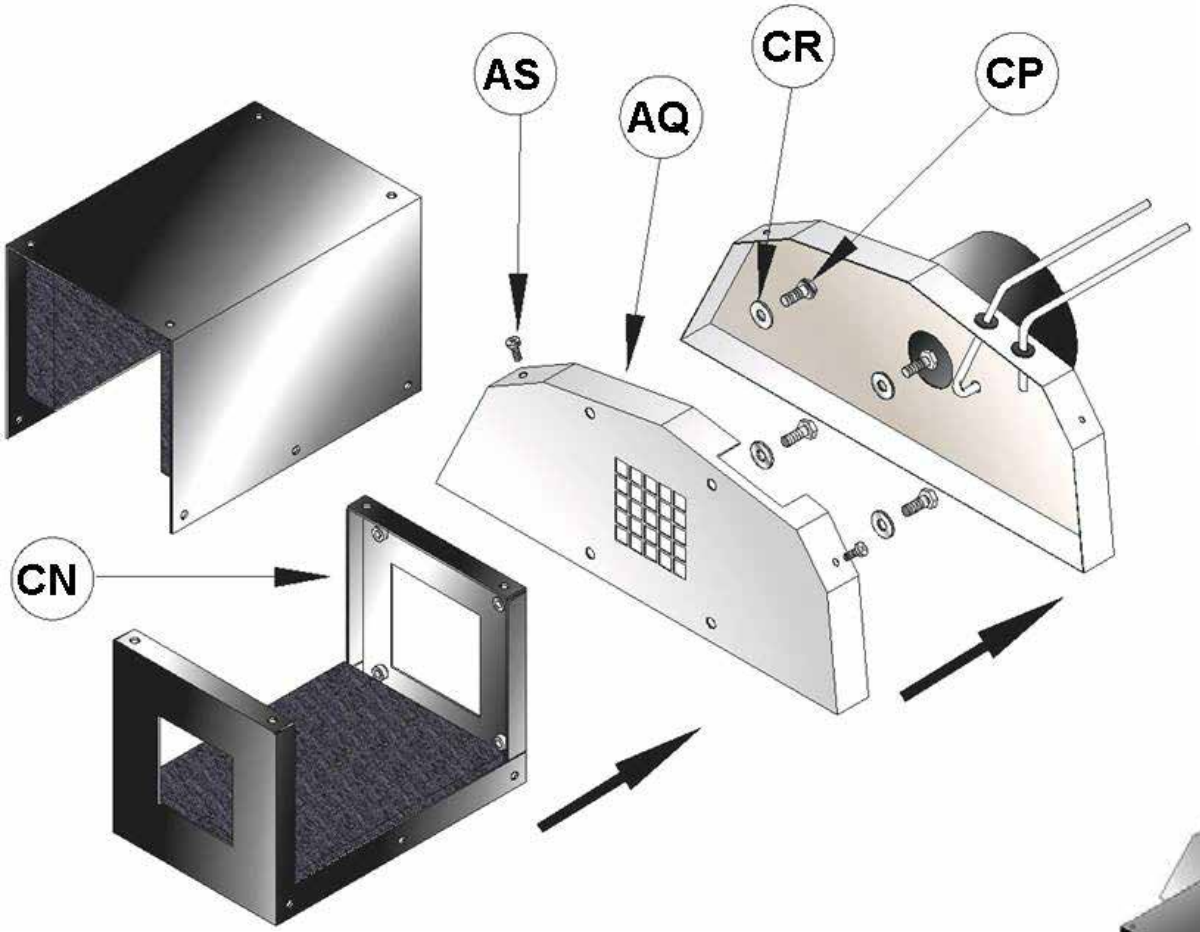
Dims:
(hwd) L103053 - 300 x 370 x 320mm
(hwd) L103054 - 330 x 410 x 320mm
brackets 50mm
Weight: 8.0kgs



CJ. Motor Muff - L103053 (B80/B160/B300), L103054 (BH300); CK. M10 x 25 Set Pin - 5481; CL. M10 Nut - 5487; CM. M10 Washer - 5480

2.21 Installation of the End Vent Silencer

The Nor-Ray-Vac End Vent Silencer - reduces the break out noise from the inrush of air into the combustion tube when installed within areas where noise is an issue. It is constructed of noise reducing panels assembled in an enclosure.

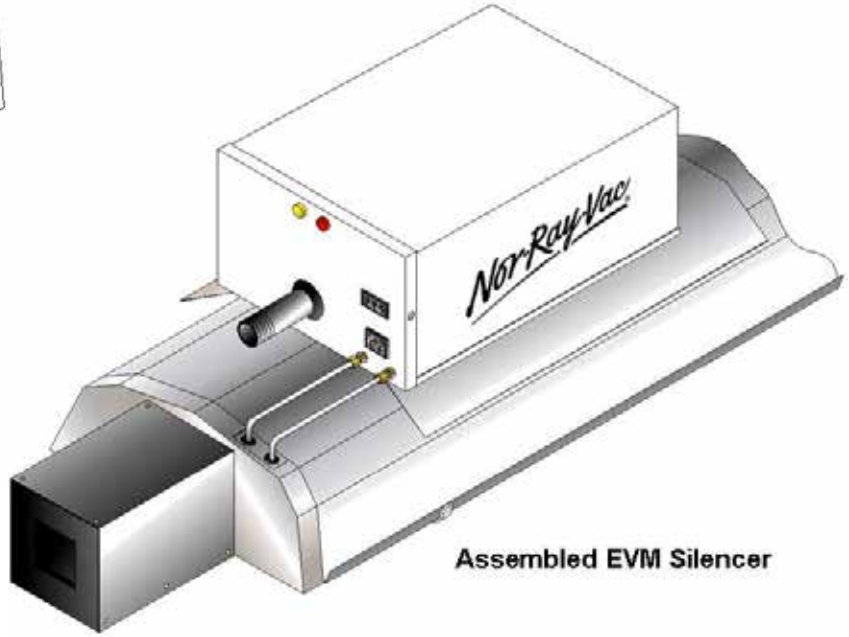


2.21.1 Assembly

2.21.1.1 Remove cover plate (AQ) of the end vent module by releasing the 2 set screws (AS).

2.21.1.2 Offer the silencer (CN), up to the cover plate of the end vent module and attach by fixing the 4 set screws(CP) and washers (CR) to the hank bushes in the end of the silencer box.

2.21.1.3 Re-attach the cover plate (AQ) to the end vent module and fix in position using the 2 set screws (AS).



Assembled EVM Silencer

AQ. EVM Outer Plate; AS. EVM Fastener; CN. EVM Silencer - L104051-SUB; CP. M6 x 12mm Set Pin - 5417-1; CR. M6 Washer - 5405

Notes:.

Notes:.

This manual replaces the previous manual: Part No. 70071
Current full Part No. Reznor, NRV M Assembly, EN Mar18 D301041

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