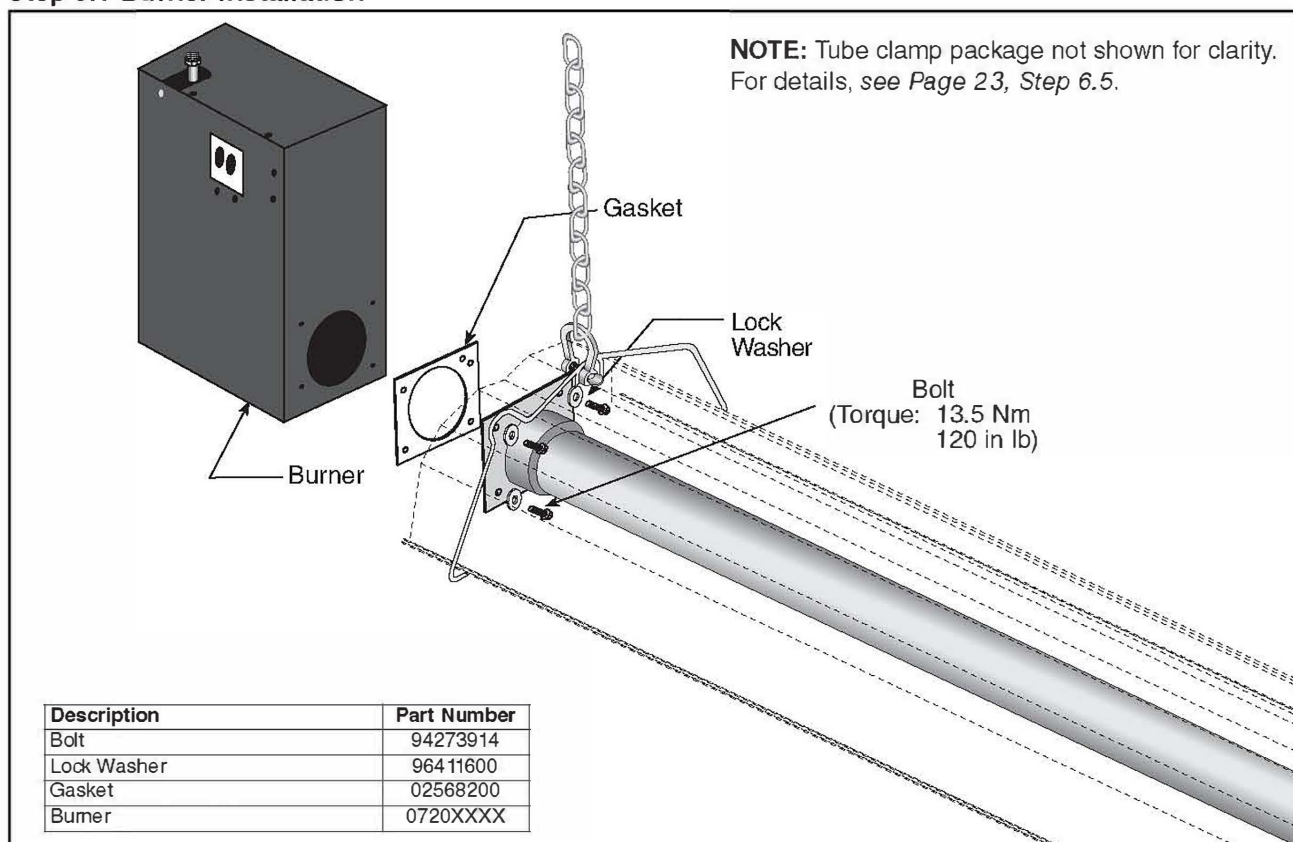
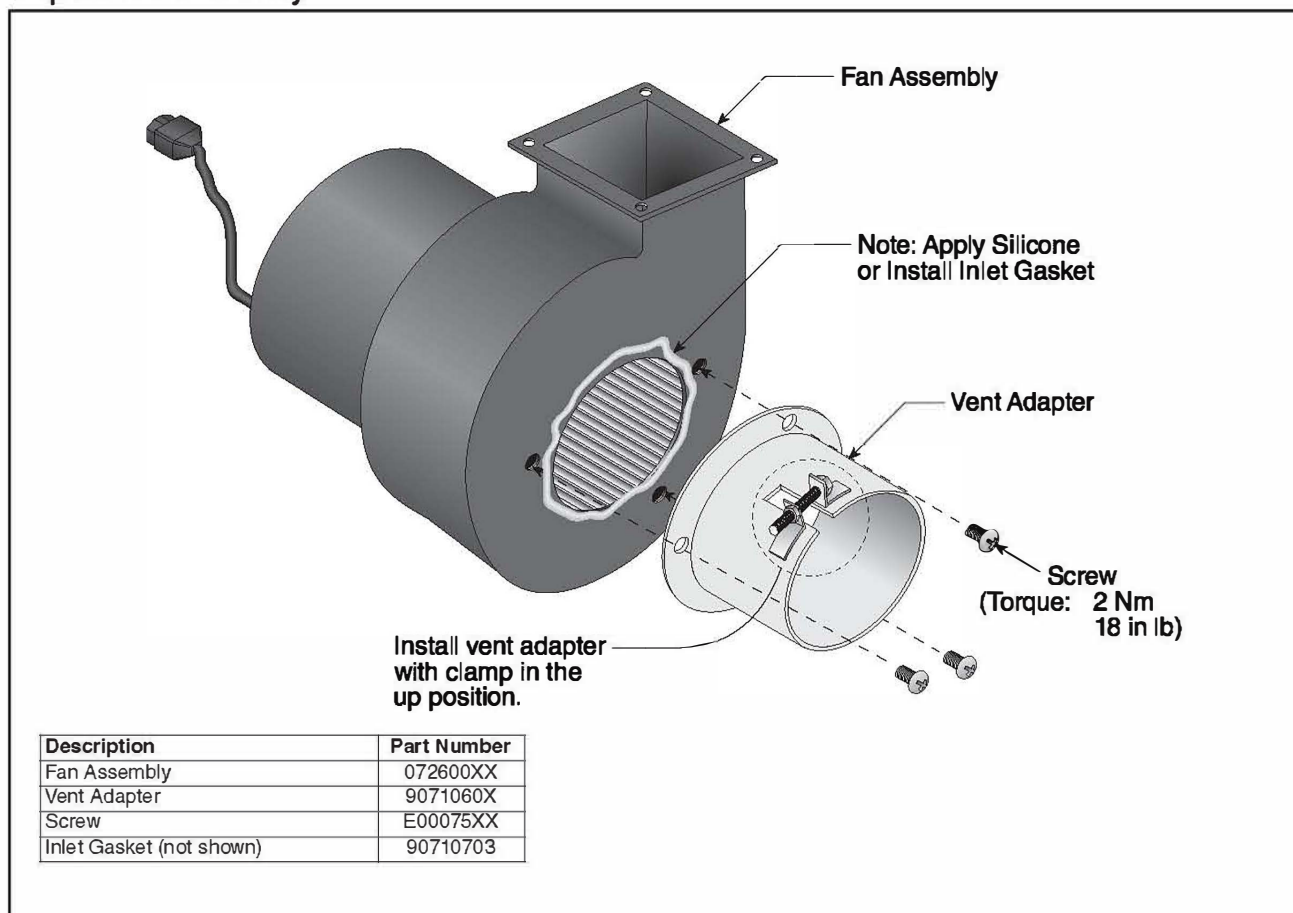


SECTION 9: BURNER & FAN INSTALLATION

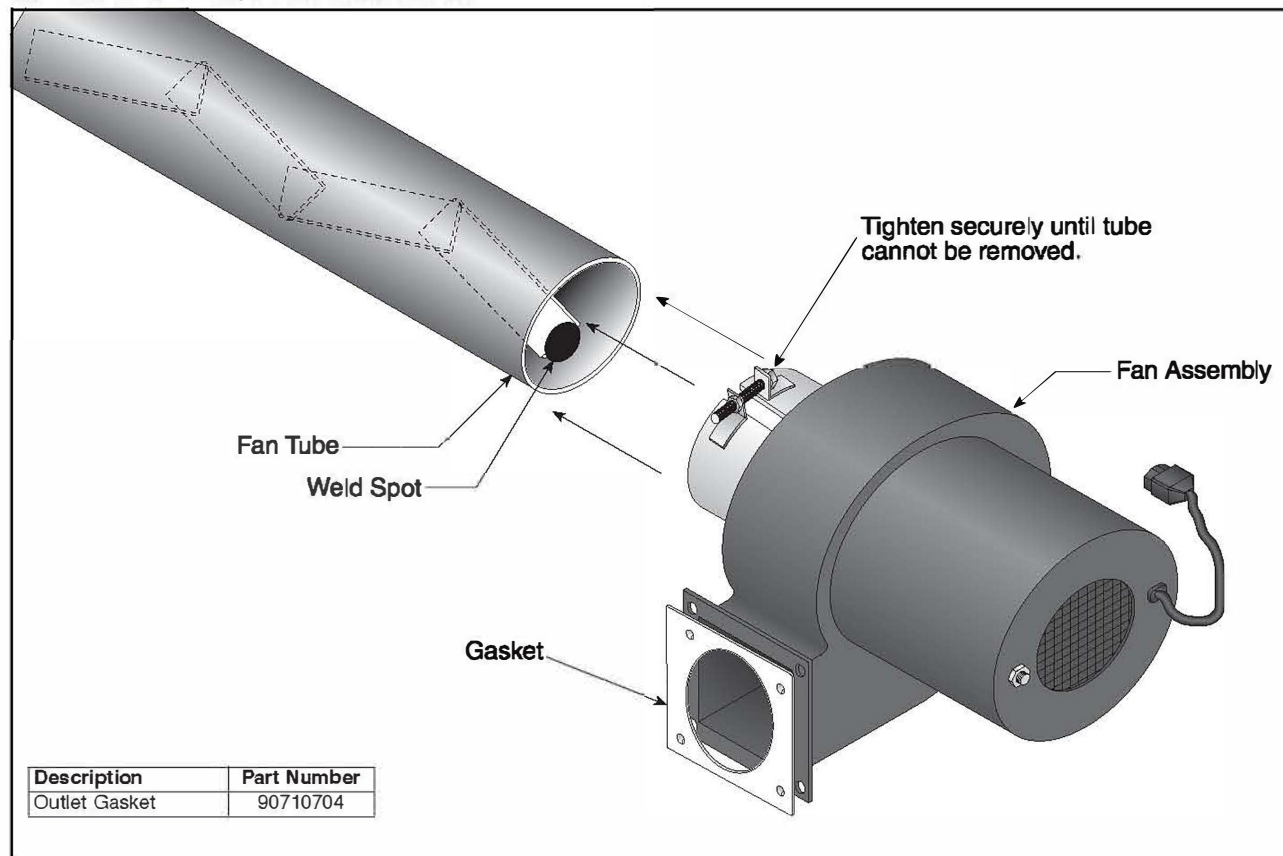
Step 9.1 Burner Installation



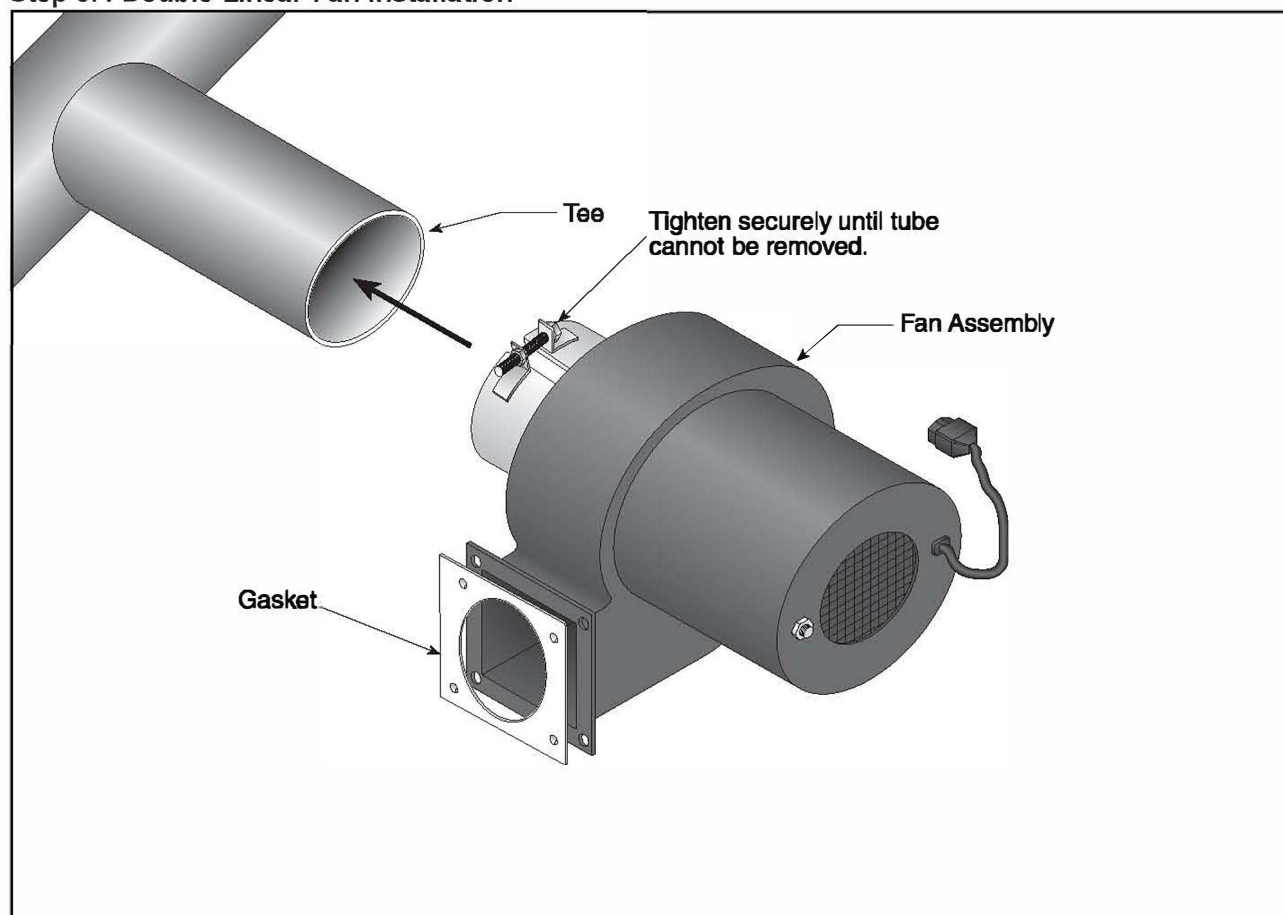
Step 9.2 Fan Assembly



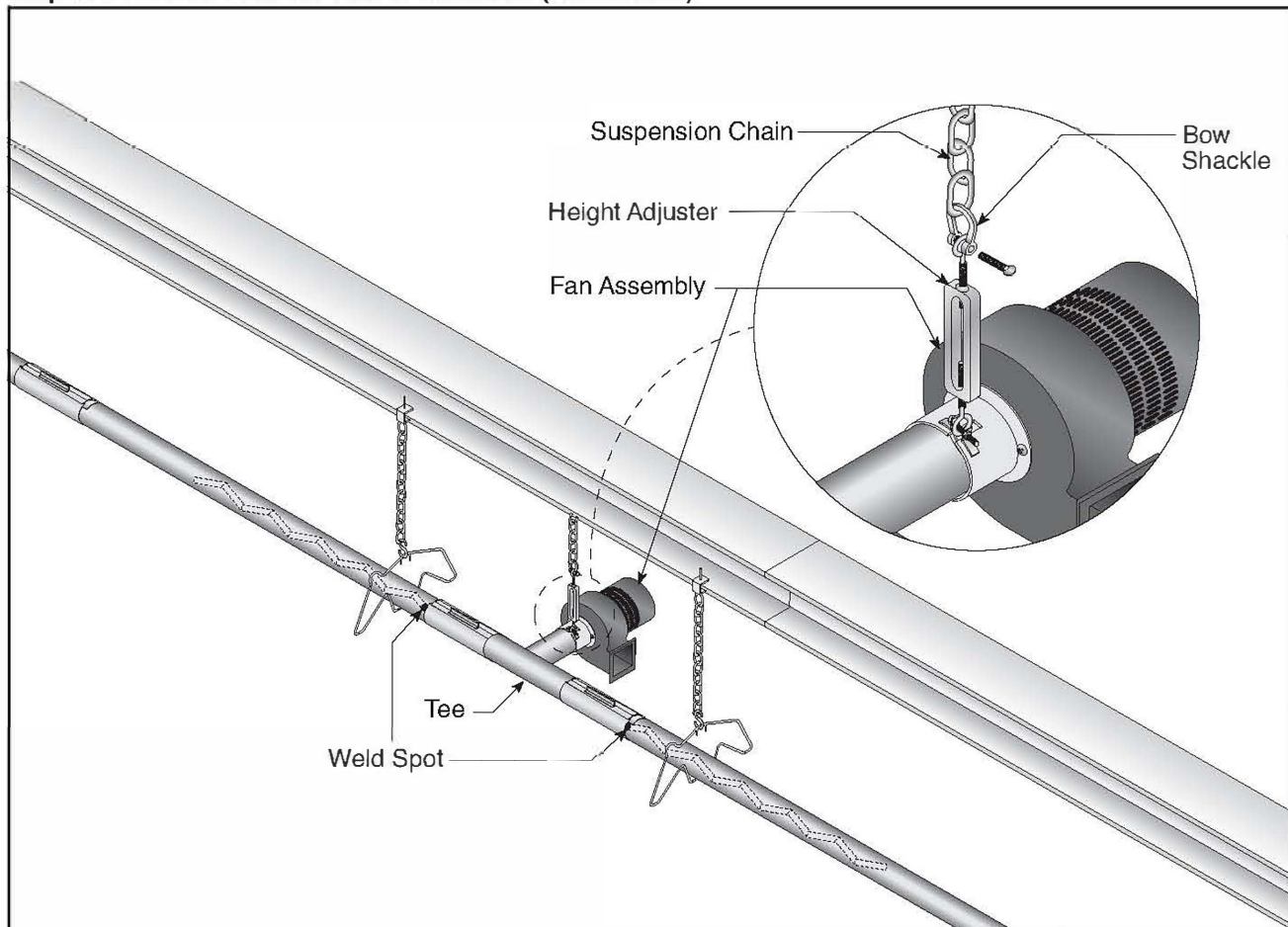
9.3 Linear & U-Tube Fan Installation



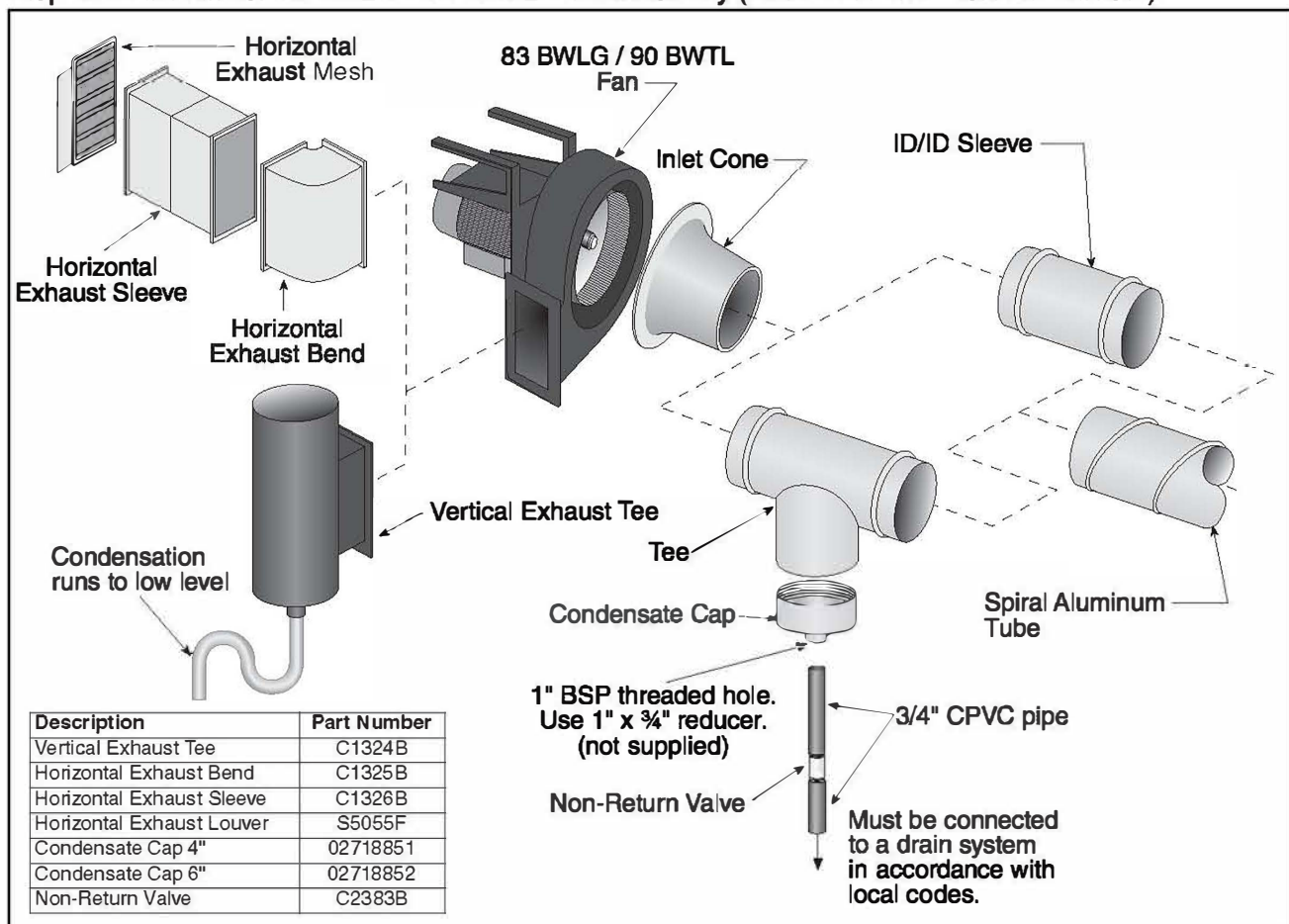
Step 9.4 Double Linear Fan Installation



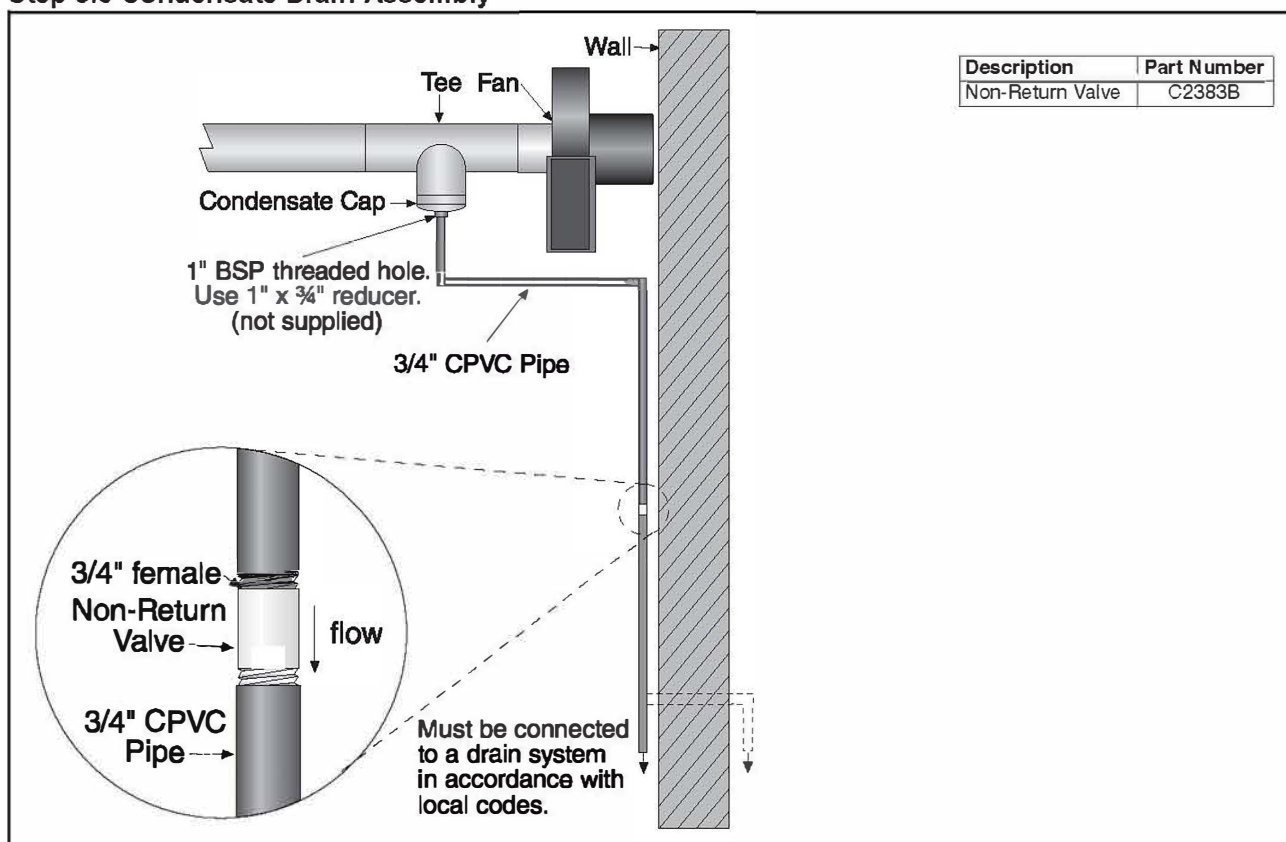
Step 9.4.1 Double Linear Fan Installation (Continued)



Step 9.5 Multiburner 83 BWLG / 90 BWTL Fan Assembly (Horizontal and Vertical Outlets)



Step 9.6 Condensate Drain Assembly



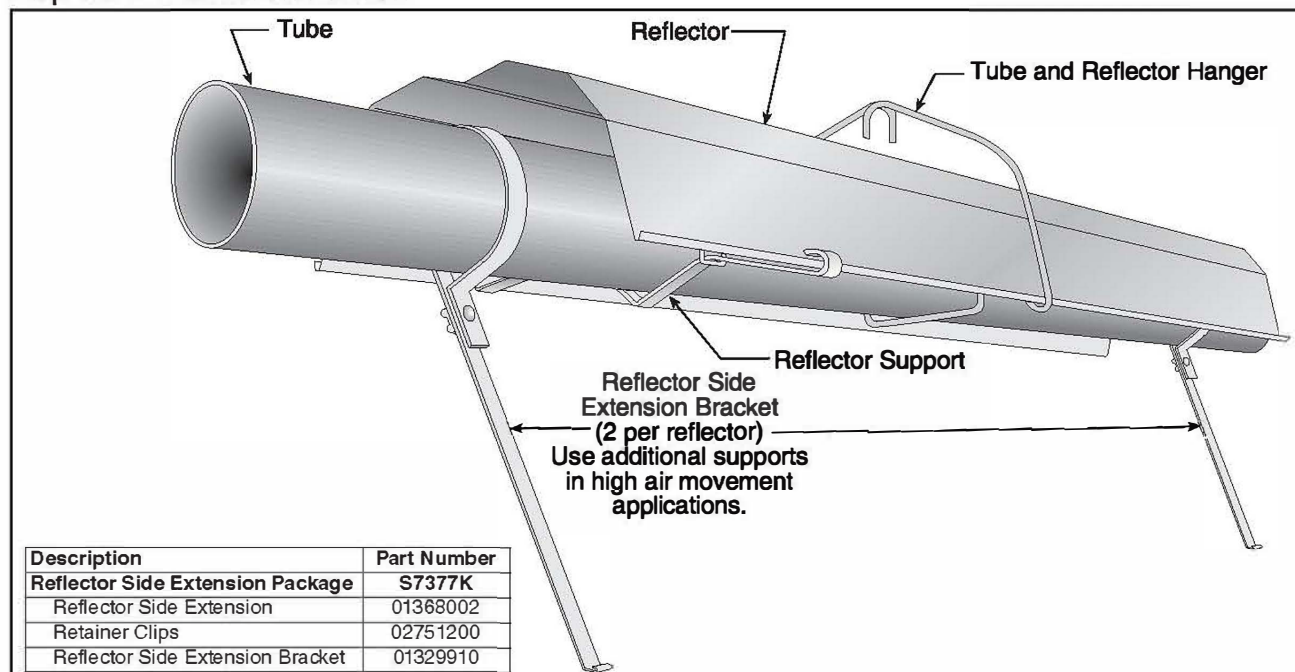
SECTION 10: OPTIONAL HEATER ACCESSORIES

⚠ WARNING

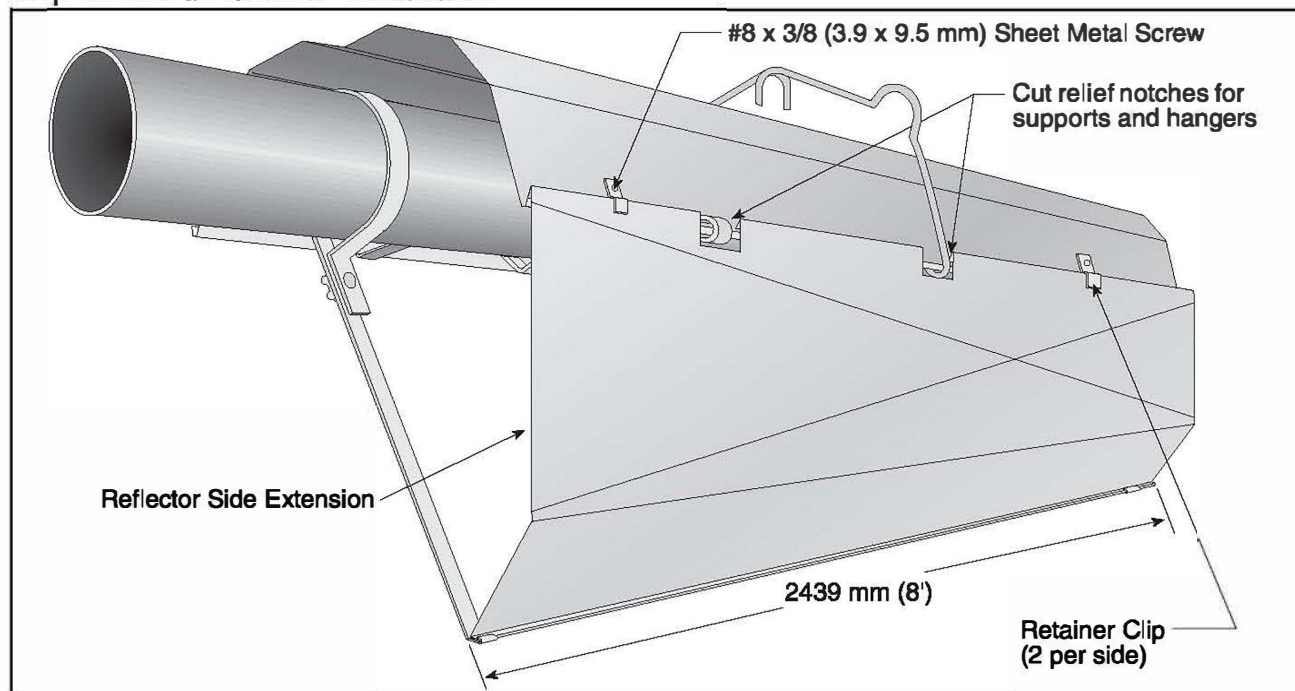
<p>Cut/Pinch Hazard</p> <p>Wear protective gear during installation, operation and service.</p> <p>Edges are sharp.</p> <p>Failure to follow these instructions can result in injury.</p>

10.1 Reflector Side Extension Installation

Step 10.1.1 Bracket Installation



Step 10.1.2 Side Reflector Installation



10.2 U-Tube Cover Installation

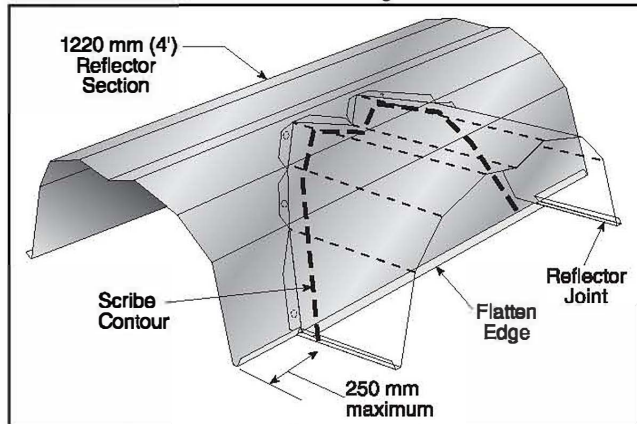
The package contains two reflector joint pieces (P/N 02750913), one 2439 mm (8') reflector and 18 x #8 sheet metal screws. Install the U-tube cover using the following procedure.

Step 10.2.1

Cut the 2439 mm (8') reflector in half to be used on both sides to cover the U-tube.

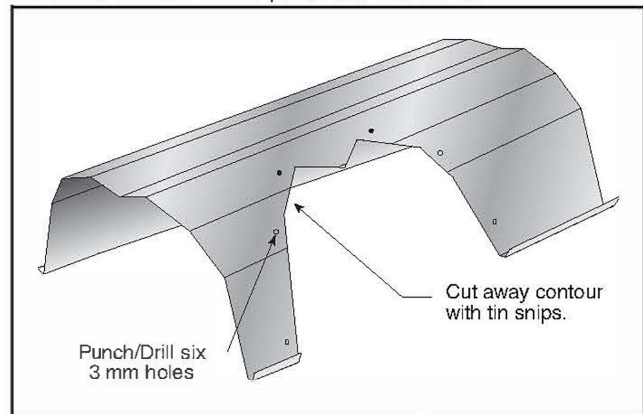
Step 10.2.2

Flatten 1220 mm (4') reflector edge where joint piece matches. Put a mark on the 1220 mm (4') reflector, directly over the tube center. Center the accessory joint piece on the mark and scribe its contour on the reflector. Scribe the location of the mounting holes.



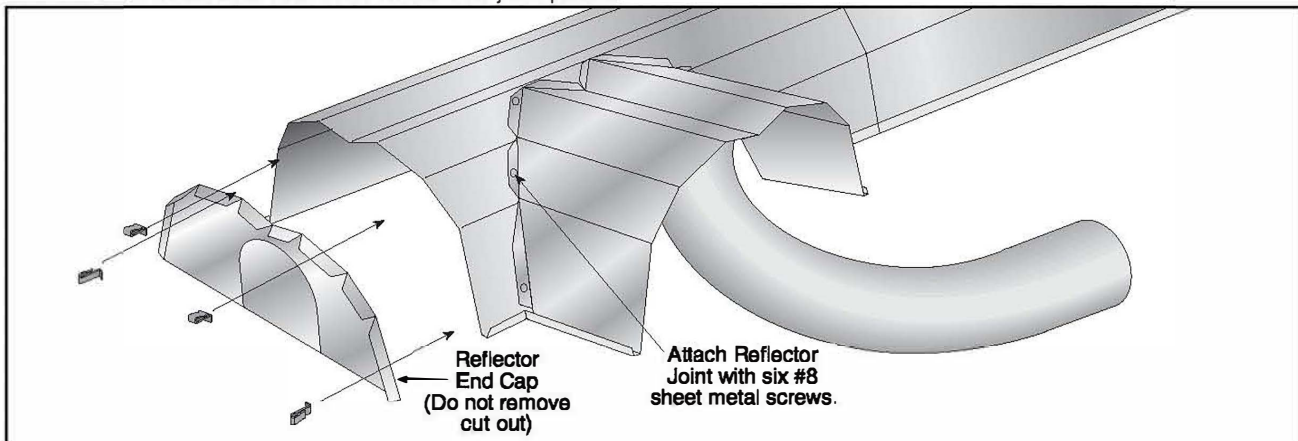
Step 10.2.3

Cut away the reflector to clear the tube, leaving about 250 mm (1") of material inside the scribed contour to attach the accessory joint. Drill or punch six 3 mm diameter holes in reflector in the positions shown below.



Step 10.2.4

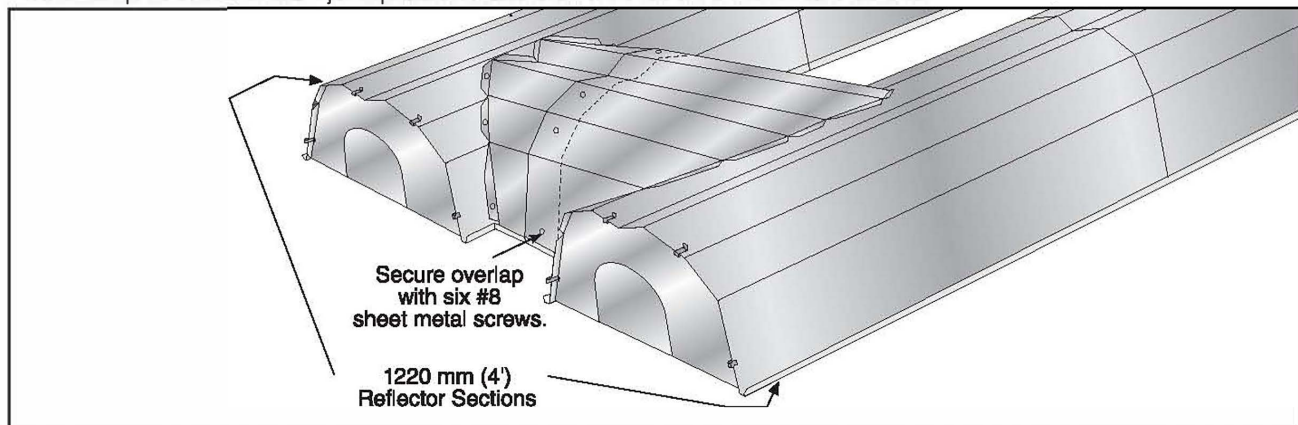
Use six #8 sheet metal screws to attach the joint piece.



Repeat Step 10.2.1 through Step 10.2.4 to attach the reflector joint piece on the other reflector.

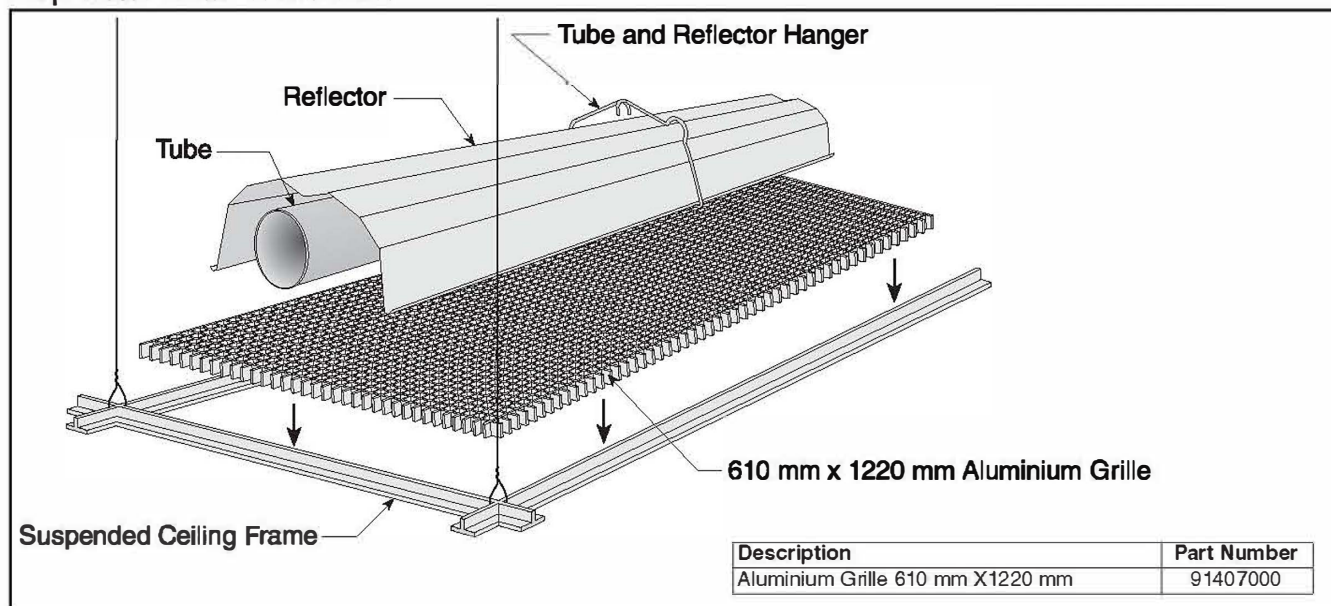
Step 10.2.5

The overlap of both reflector joint pieces is attached with six #8 sheet metal screws.

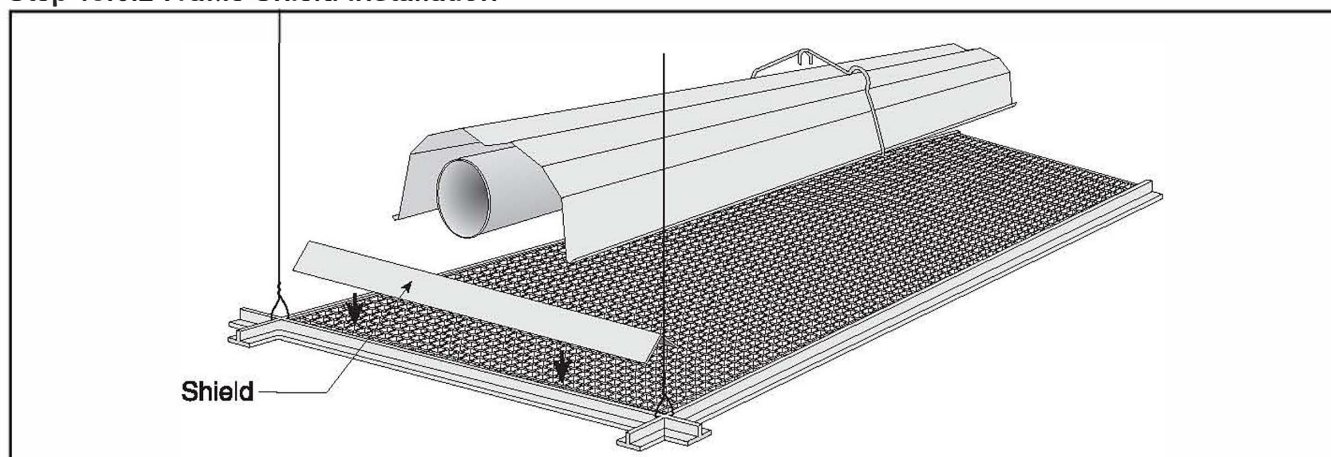


10.3 Decorative Grille Installation

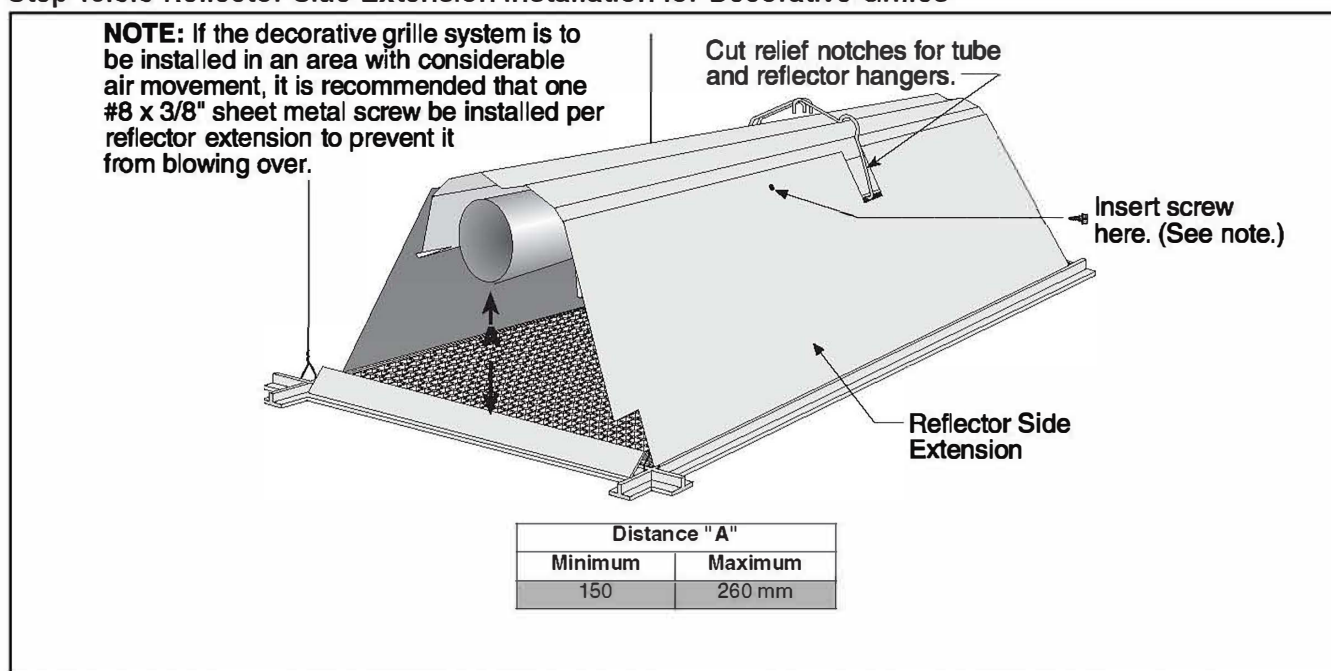
Step 10.3.1 Grille Installation



Step 10.3.2 Frame Shield Installation

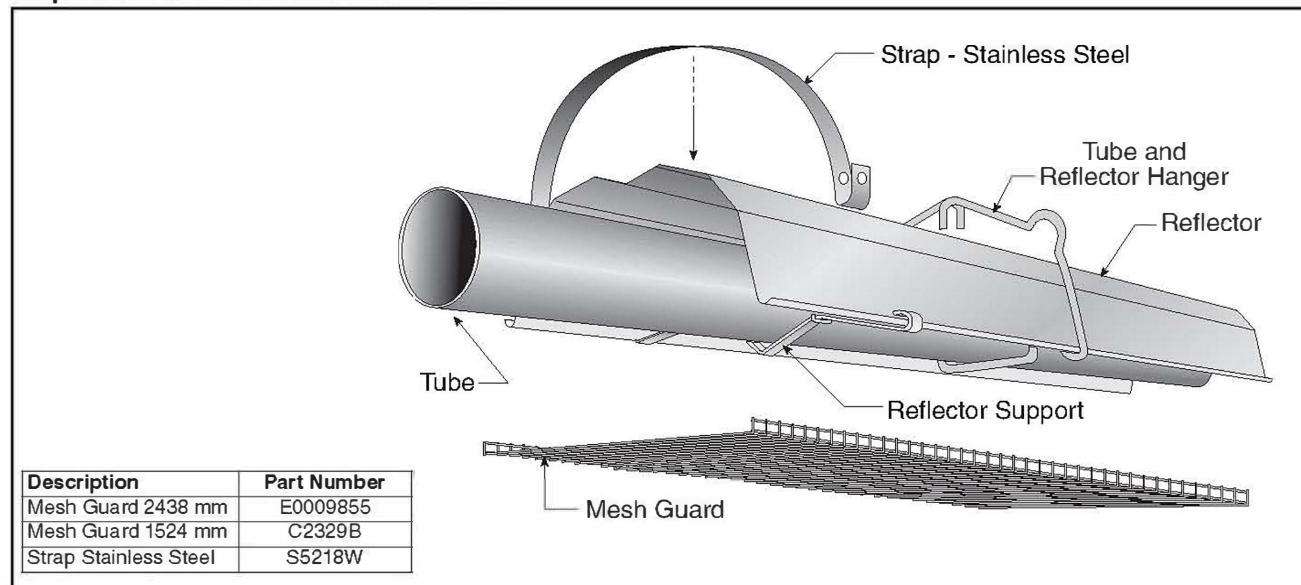


Step 10.3.3 Reflector Side Extension Installation for Decorative Grilles

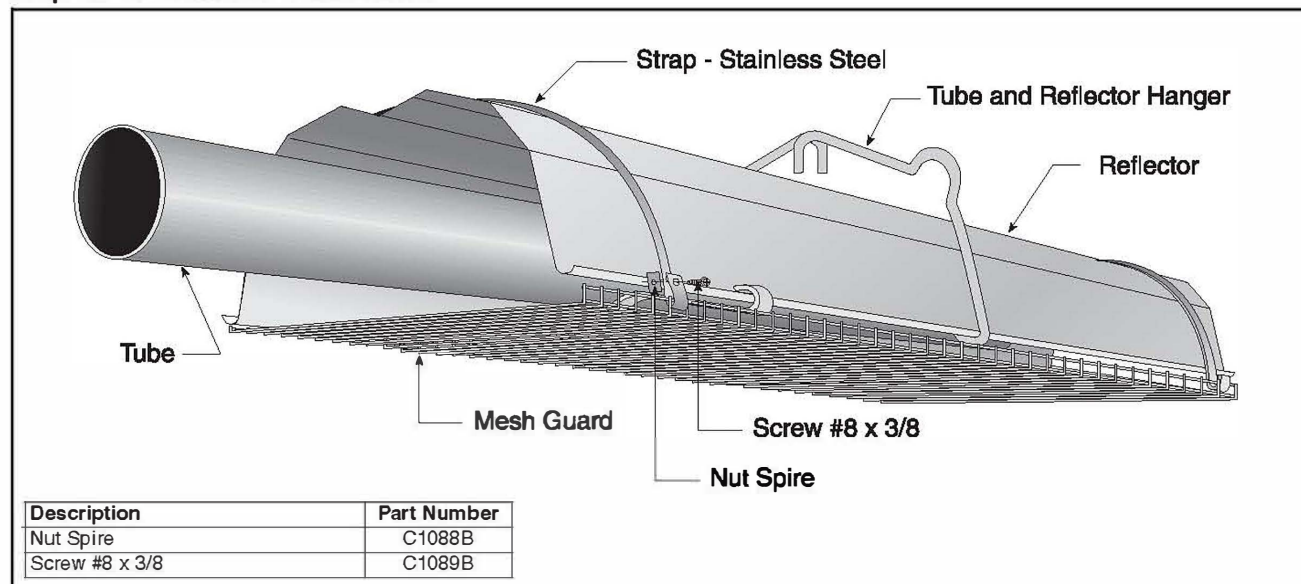


10.4 Sports Hall Guard Installation

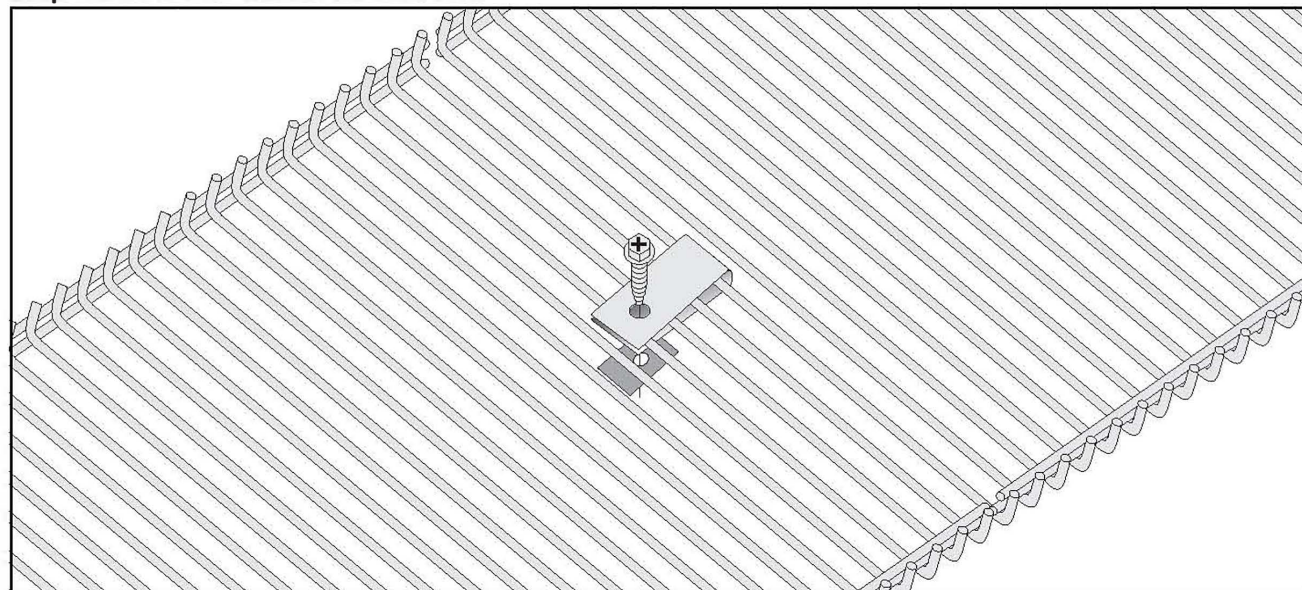
Step 10.4.1 Grille Installation



Step 10.4.2 Fastener Installation

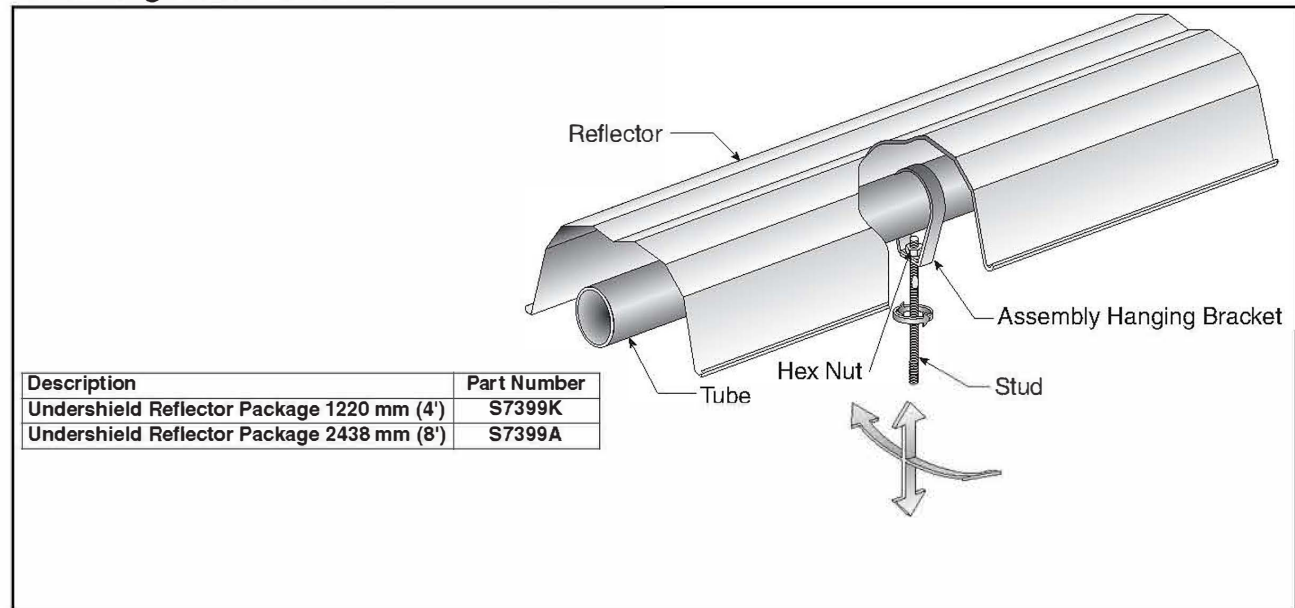


Step 10.4.3 Mesh Guard Connection

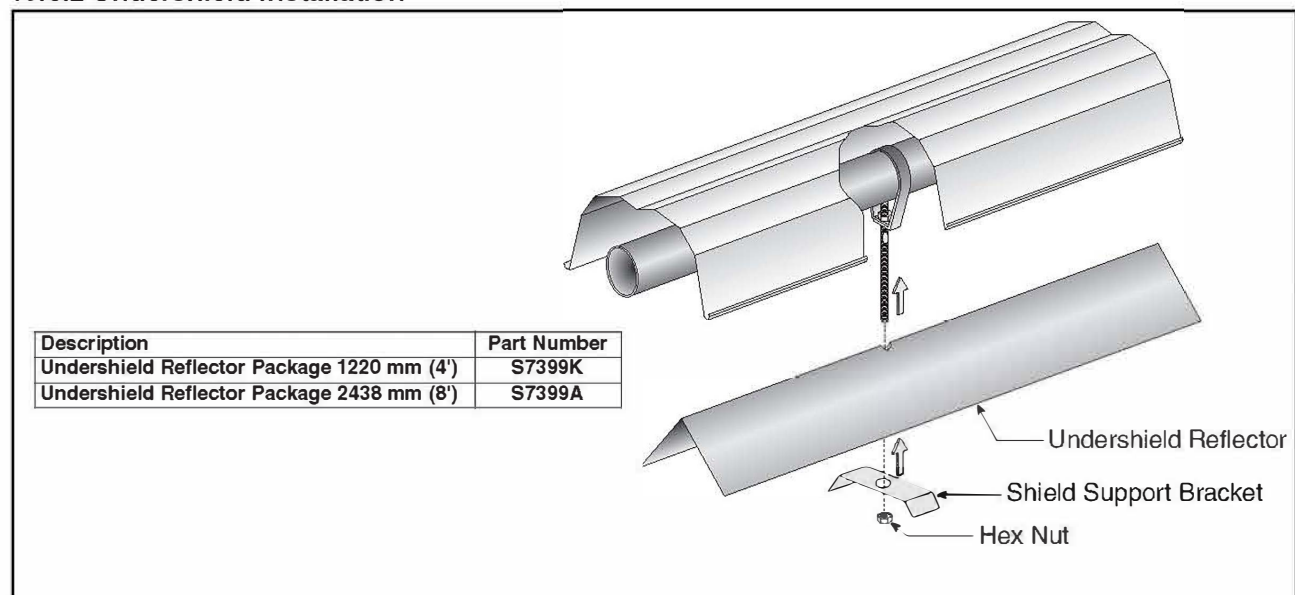


10.5 Undershield Installation

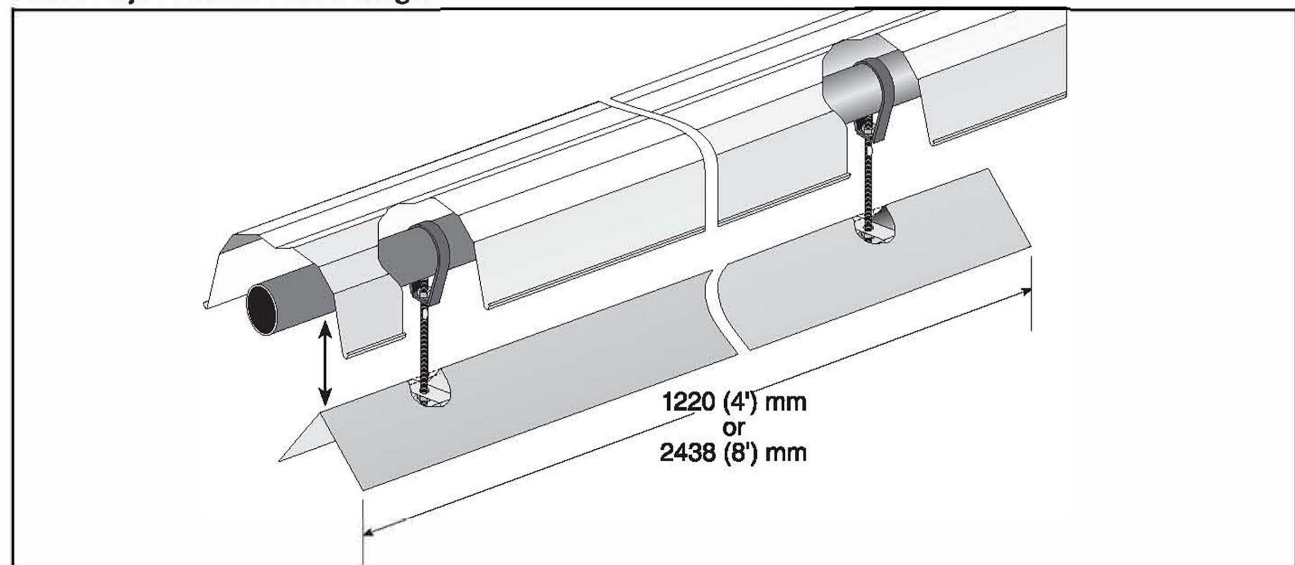
10.5.1 Hanger Installation



10.5.2 Undershield Installation



10.5.3 Adjust Undershield Height



10.6 Wall Mounting

Install wall mounting brackets at the height shown in the layout drawing provided by the estimator. Space wall mounting brackets and hangers as indicated by dimensions d, e and f (u-tube) in the relevant layout overview drawing for your heater. For linear heaters see *Page 17, Figure 20*, for double linear heaters see *Page 20, Figure 22* and for U-tube heaters see *Page 30, Figure 24*.

10.6.1 Hardware Installation

The wall mounting brackets must be attached to a suitable wall through all mounting holes. Screw sizes less than M8 (5/16") may not be used. In order for the wall

mounting brackets to adequately carry the weight of the heater, it must be installed with best building practice.

Model	Quantity of Wall Mounting Brackets	Model	Quantity of Wall Mounting Brackets
CMP15UT	2	CMP15ST	3
CMP20UT	3	CMP20ST	4
CMP25UT	3	CMP25ST	4
CMP30UT	3	CMP30ST	5
CMP35UT	3	CMP35ST	5
CMP40UT	3	CMP40ST	5
CMP45UT	4	CMP45ST	6
CMP50UT	4	CMP50ST	6

Figure 27: U-Tube (Horizontal)

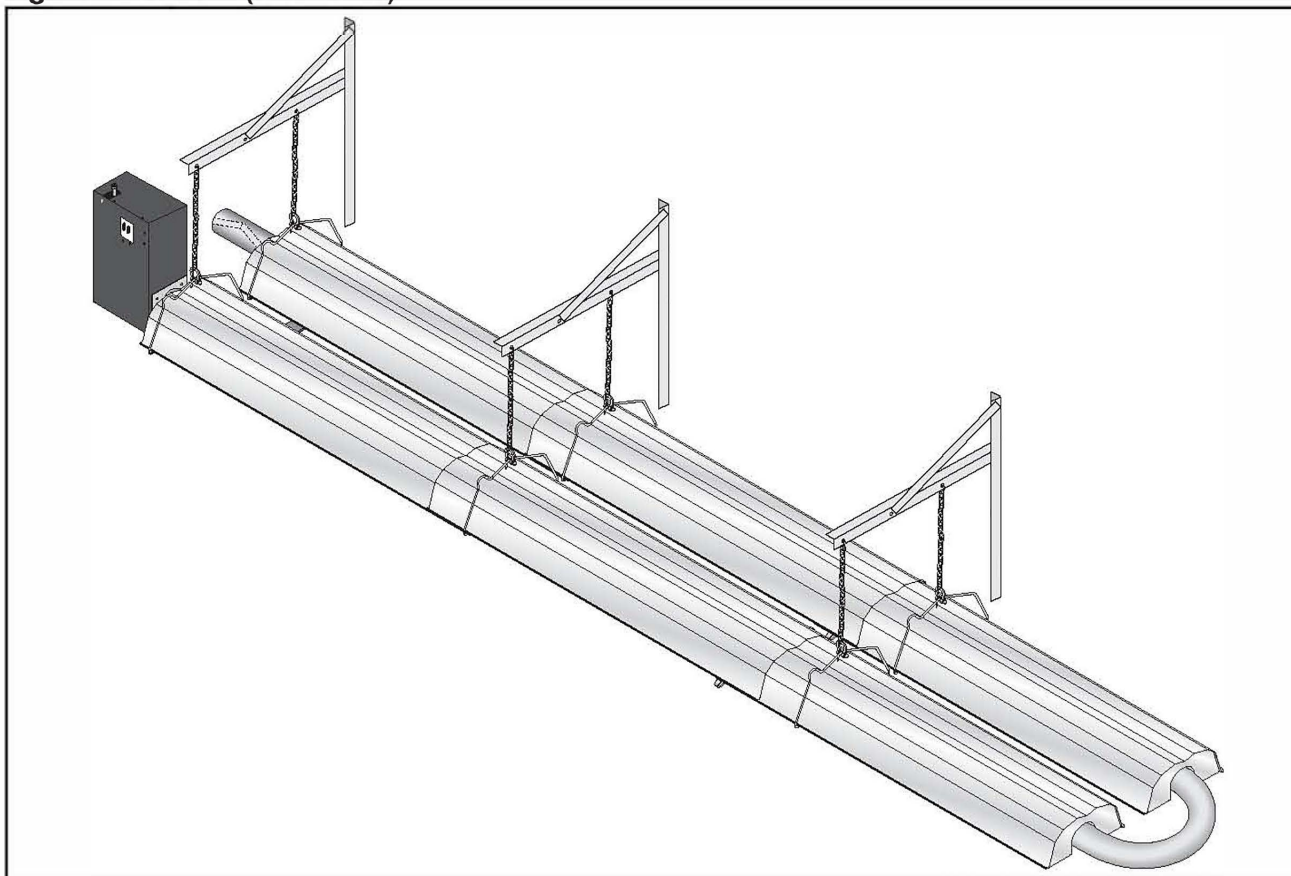


Figure 28: U-Tube (Angle Mounted)

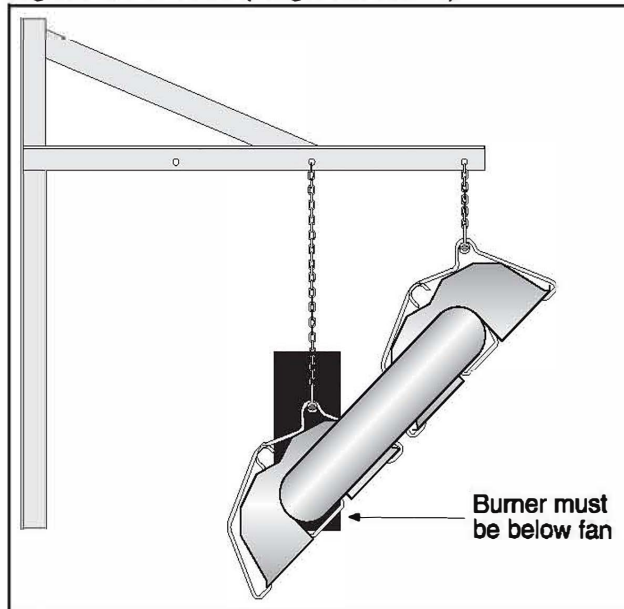


Figure 29: Linear



SECTION 11: VENTING

⚠ WARNING



Carbon Monoxide Hazard

Multiburner systems are not approved for unvented use and must be vented outdoors.

Unitary heaters installed unvented must be interlocked with sufficient building exhaust.

Heaters must be installed according to the installation manual.

Failure to follow these instructions can result in death or injury.

⚠ WARNING



Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

11.1 General Venting Requirements

Flue materials are not included with the heater.

Heaters may be installed flued or unflued but in all cases in accordance with the requirements of AS/NZS 5601-2014 [or later].

If total heat input of all appliances exceeds 0.2 MJ per cubic metre, all appliances must be flued.

If appliances are under thermostat control, all appliances must be flued if total heat input exceeds 0.4 MJ per cubic metre.

FLUES MAY BE MANDATORY FOR SOME APPLICATIONS AND MUST BE FITTED WHEN SPECIFIED.

11.1.3 Flue Installation

The fan outlet may discharge vertically or horizontally. Connection should be made using 100 mm minimum diameter aluminium or stainless steel flue material to National Standard and must be adapted to insert into the 100 mm flue adapter. Both fresh air supply and flue duct shall not exceed 10,000 mm. CMP15 and CMP20 flue

must be insulated if longer than 5,000 mm. CMP25 flue must be insulated if longer than 8,000 mm. Contact the manufacturer if more than 2 x 45° offset bends are necessary. The flue must be self supporting.

11.1.4 Flueless Installation

If the heater is being installed in an area where combustion products can be dissipated within the building, ensure that the fan outlet is horizontal and away from the burner. Where installation is close to a wall (perimeter system) or other obstruction close to the fan outlet or wall angle mounted, install the heater so that the fan tube is the furthest away from the wall or obstruction, i.e. the fan will always blow into the building or away from the obstruction.

11.2 Ventilation Requirements

Detailed recommendations for air supply are given in the relevant National Standards. There must be an adequate supply of air for both combustion and general ventilation. Air vents should have negligible resistance. Do not locate air vents where they can be easily blocked or flooded, or adjacent to any flues or extraction systems carrying flammable vapour.

11.2.1 Flue Installation

For design air changes less than 0.5/h following requirements apply.

For natural ventilation low level openings must be provided of at least 2 cm²/kW input installed. For mechanical ventilation an air change rate of at least 0.5/h must be ensured.

Room sealed heaters need no additional building ventilation.

11.2.2 Flueless Installation

Flueless installation is permitted in accordance with the requirements of AS/NZS 5601-2014 [or later] and details under *Section 11.1*.

EXTERNAL INSTALLATIONS:

Flues may be required for external installations where, for example, the outdoor area [although normally open] may have blinds installed which can restrict the amount of fresh air available for the heater location.

Figure 30: Individual Flue Connection Detail

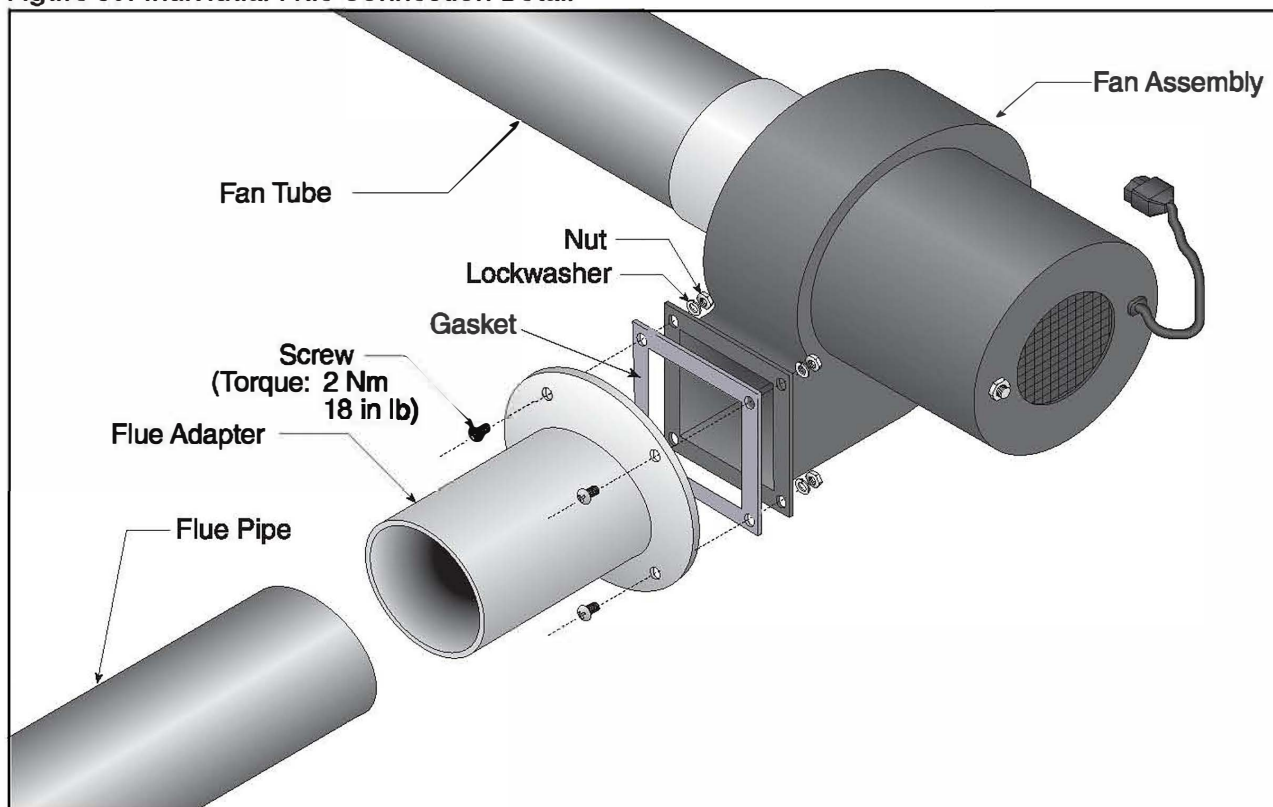
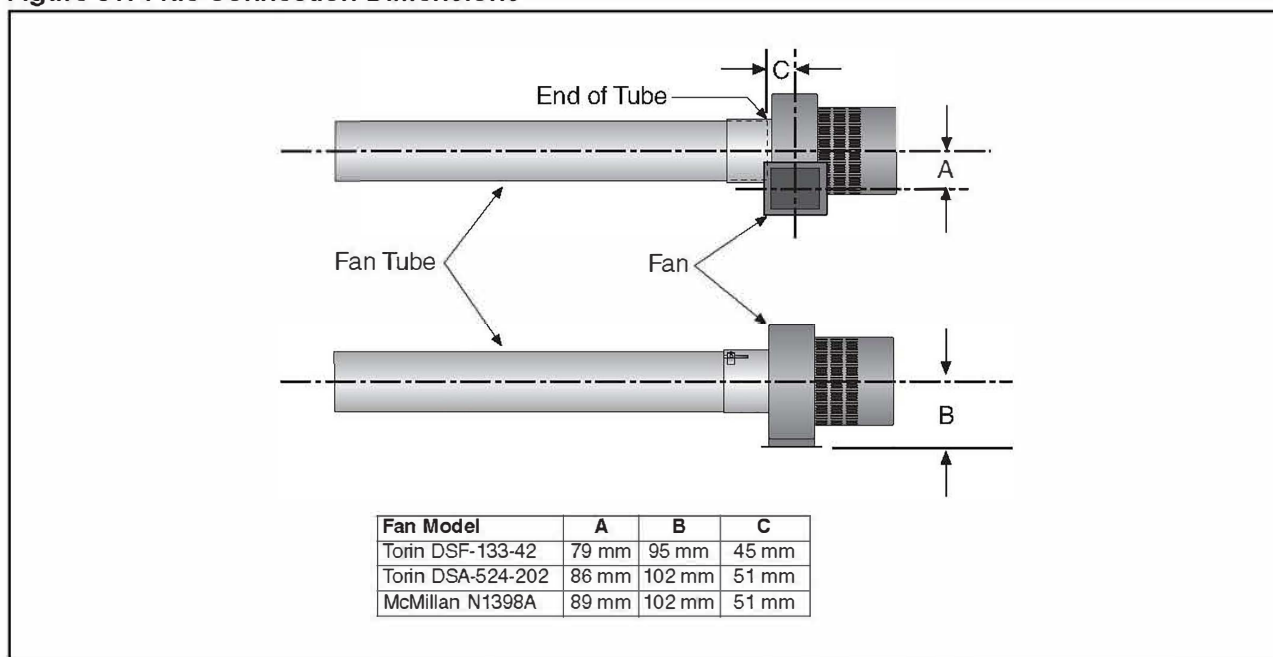


Figure 31: Flue Connection Dimensions



11.3 Outside Combustion Air Supply

Where necessary, clean air may be ducted into the burner box through an added spigot on the back of the burner box replacing the existing dust arrest baffle plate.

See Page 51, Section 11.1.3 for recommendations on duct length. Air duct should be as straight as possible. Do not use bends in excess of 45°. Consult the manufacturer if more than 2 x 45° offset bends are necessary. The fresh air duct must be self supporting.

11.3.1 Air Supply Requirements

When fresh air duct is used, follow one of these rules:

- The flue must penetrate the roof while fresh air can penetrate any wall. (See Page 53, Figure 33)
- The flue and fresh air supply must penetrate the same roof, at a minimum of 1 m apart. (See Page 53, Figure 33)
- The flue must penetrate 1 m higher than the fresh air inlet on the same wall. (See Page 53, Figure 33)

Figure 32: Fresh Air Intake Spigot

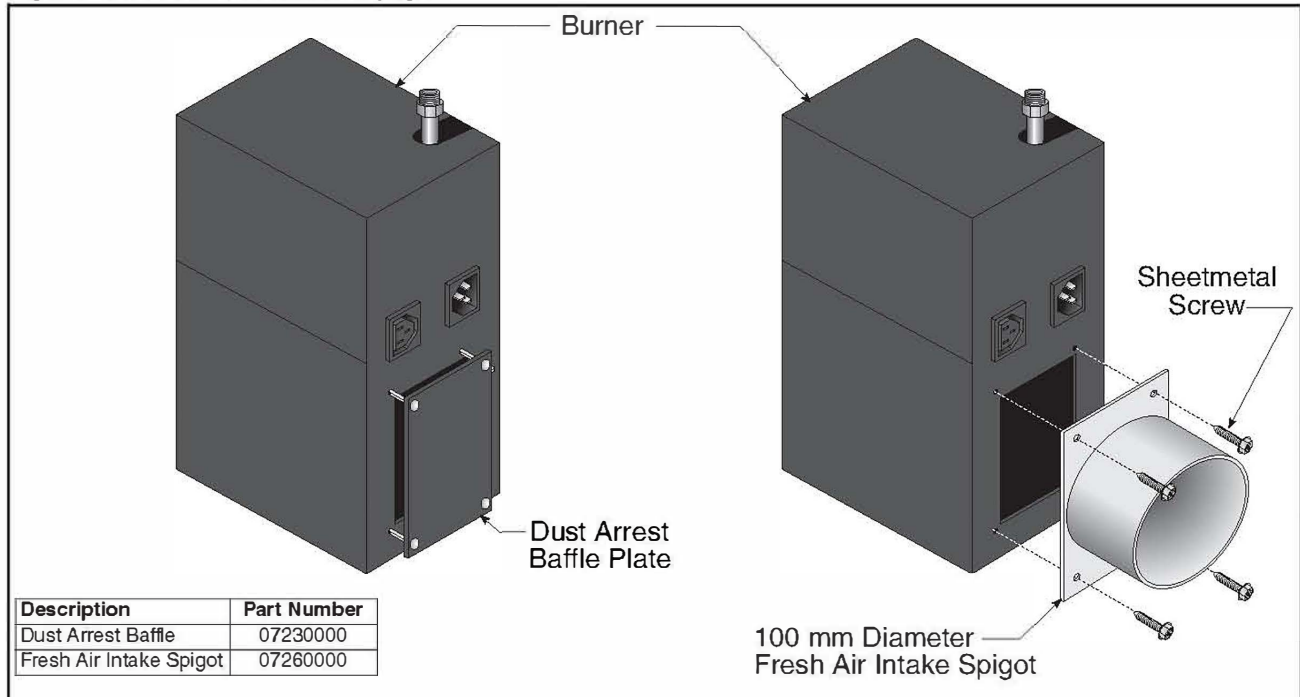
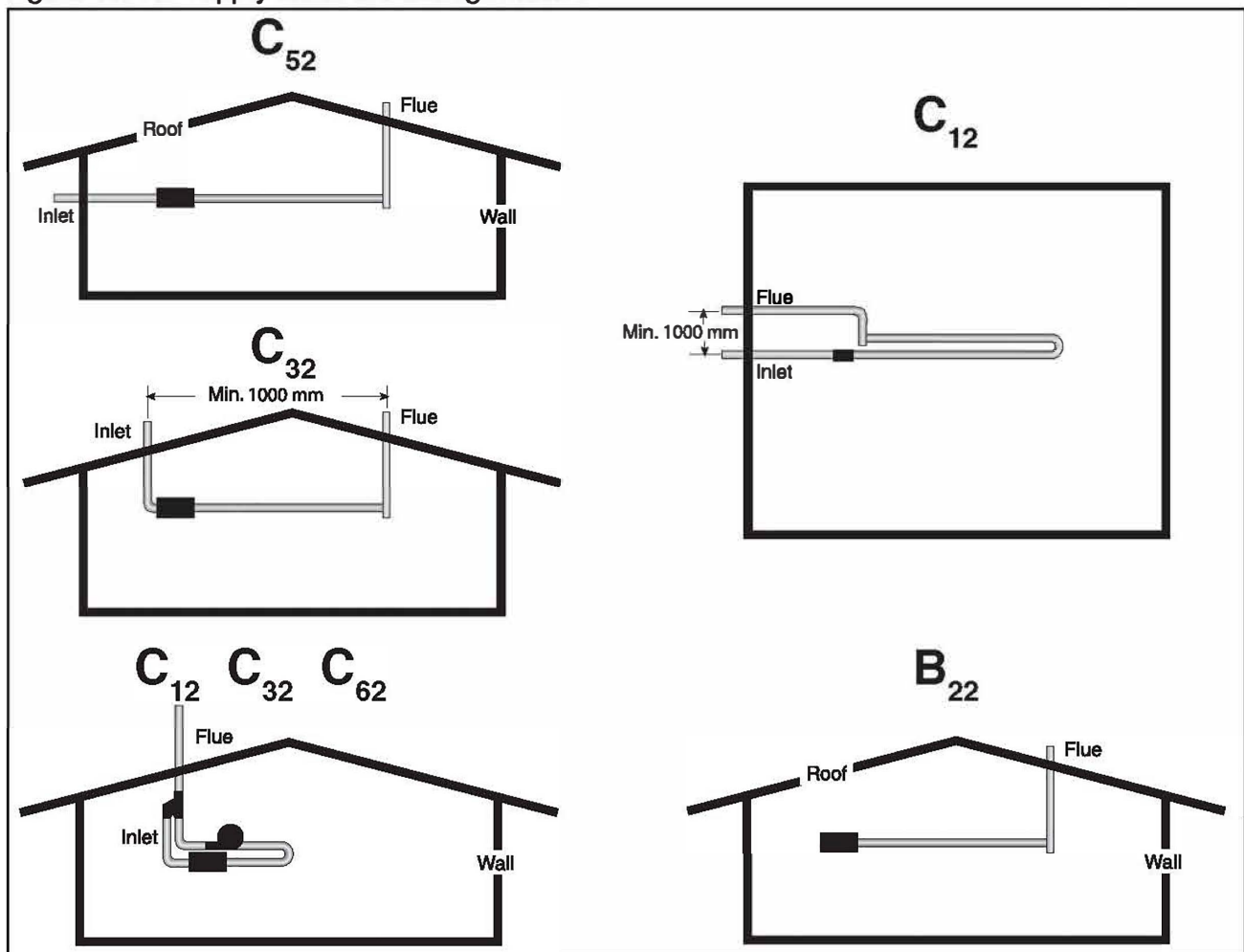


Figure 33: Air Supply with Flue Configurations



11.4 Common Duct

When using a common air inlet duct, always ensure that the area of the common air inlet duct represents the area of all air ducts.

SECTION 12: GAS PIPING

! WARNING



Fire Hazard

Tighten gas line fittings to connect gas supply according to Figure 34.

Flex gas line can crack when twisted.

Gas line moves during normal operation.

Use only 1000 mm long connector of 1/2" or 3/4" nominal ID.

Failure to follow these instructions can result in death, injury or property damage.

hose. This can cause a gas leak resulting in an unsafe condition if the gas connection is not made in strict accordance with *Figure 34*.

Meter and service must be large enough to handle all the burners being installed plus any other connected load. The gas hose which feeds the system must be large enough to supply the required gas with a maximum pressure drop of 13 mm wc. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping.

IMPORTANT - the complete installation must be tested for gas soundness and be purged in accordance with local and national codes.

- **Check the pipe and tubing ends for leaks before placing heating equipment into service. When checking for gas leaks, use a soap and water solution; never use an open flame.**

Gas supply to appliances must be installed in accordance with AS/NZS 5601 latest edition and the appliance manufacturer's instructions.

Quarter-turn isolating valve must be installed upstream of the flexible gas hose and NOT attached to the heater. The quarter-turn valve must be installed in an easily accessible location.

! WARNING



Explosion Hazard

Leak test all components of gas pipe work before operation.

Gas can leak if pipe work is not installed properly.

Do not high pressure test gas pipe work with heater connected.

Failure to follow these instructions can result in death, injury or property damage.

It is important that the gas supply pipe and electrical connections do not support any of the heater's weight.

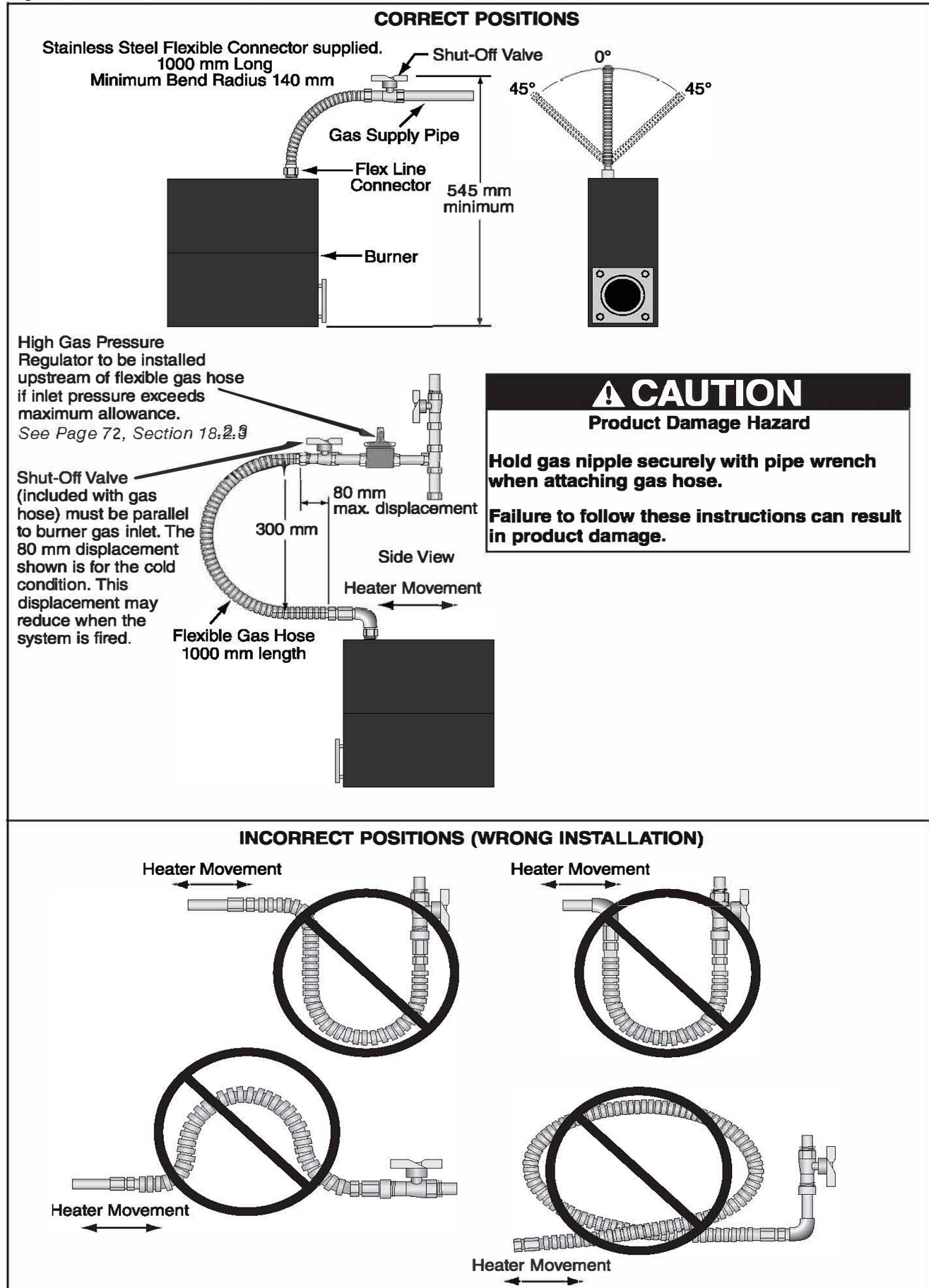
Installation pipes should be fitted in accordance with National Standards. Pipe work from the meter to the heater(s) must be of adequate size. Pipes of smaller size than the heater inlet gas connection should not be used.

Install the gas hose as shown on *Page 55, Figure 34*.

The gas hose accommodates expansion of the heating system and allows for easy installation and service of the burner. Before connecting the burners to the supply system, verify that all high pressure testing of the gas piping has been completed.

There is an expansion of the tube with each firing cycle. This will cause the burner to move with respect to the gas

Figure 34: Gas Connection with Stainless Steel Flex Connector



SECTION 13: WIRING

All wiring must be installed in accordance with AS3000 or local National Wiring Code.

⚠ DANGER



Electrical Shock Hazard

Disconnect electric before service.

Heater must be properly earthed.

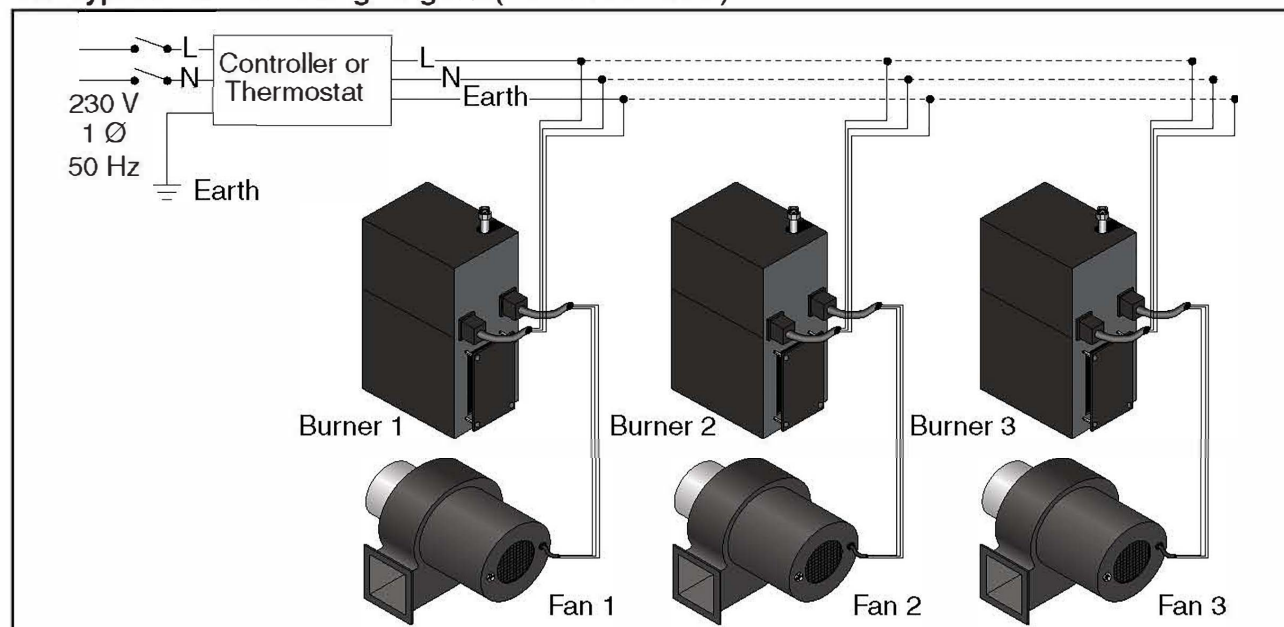
Failure to follow these instructions can result in death or electrical shock.

Connect to the electrical supply using a 3 pin plug via a locally mounted double pole fused switch having a minimum disconnection of 3 mm on each pole. This switch should be fused to 3 amps. The burner is fused at 2 amps. There are no control connections in the standard burner. Control is affected by interruption of the main power inlet. See Page 56, Section 13.1 through Page 57, Section 13.3 for the external wiring details for the single-burner, double linear and multiburner heater systems.

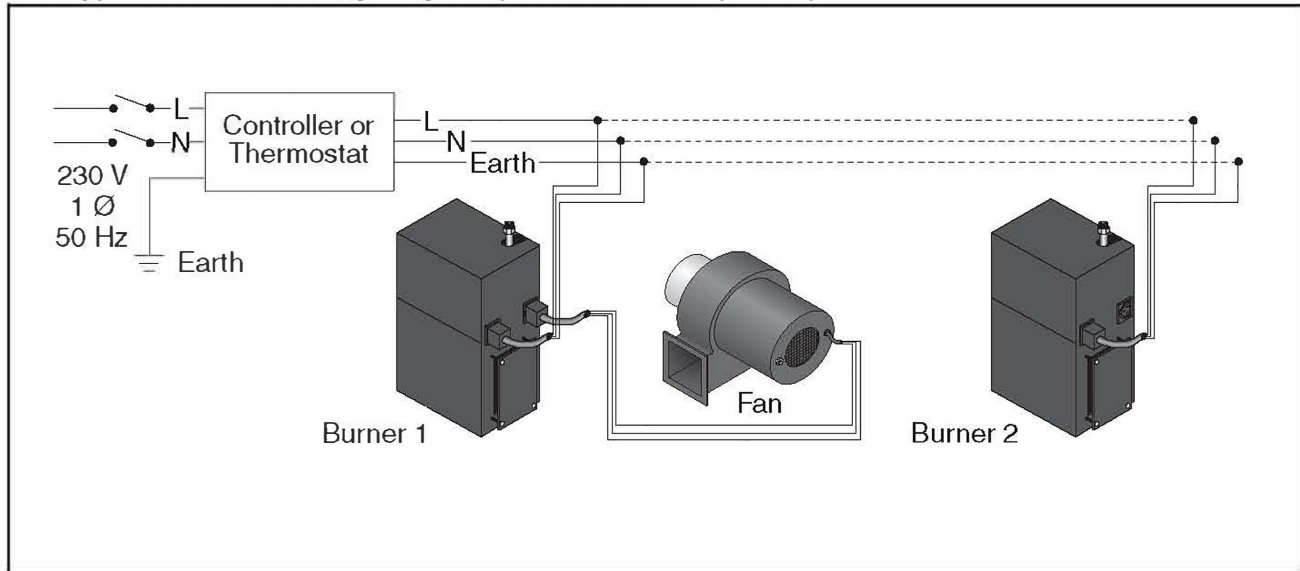
All wiring must comply with current wiring regulations and any local regulations which may apply. Always switch off the supply to the burner and disconnect by removing the plug before removing the burner side panel.

For lockout indication, establish connection inside burner with grey wire and ignition module connection (CON 5 Pin 4).

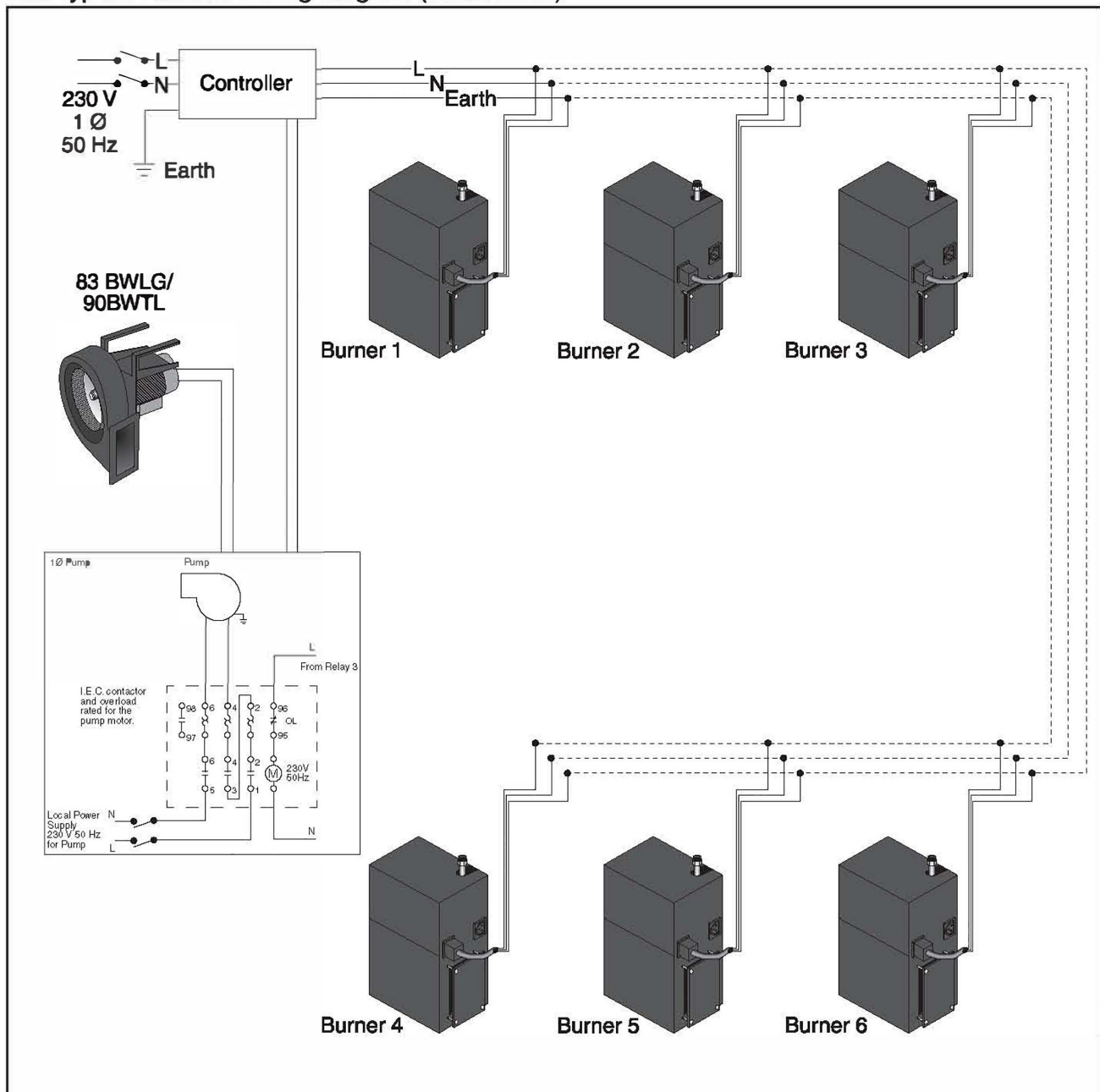
13.1 Typical External Wiring Diagram (Linear or U-Tube)



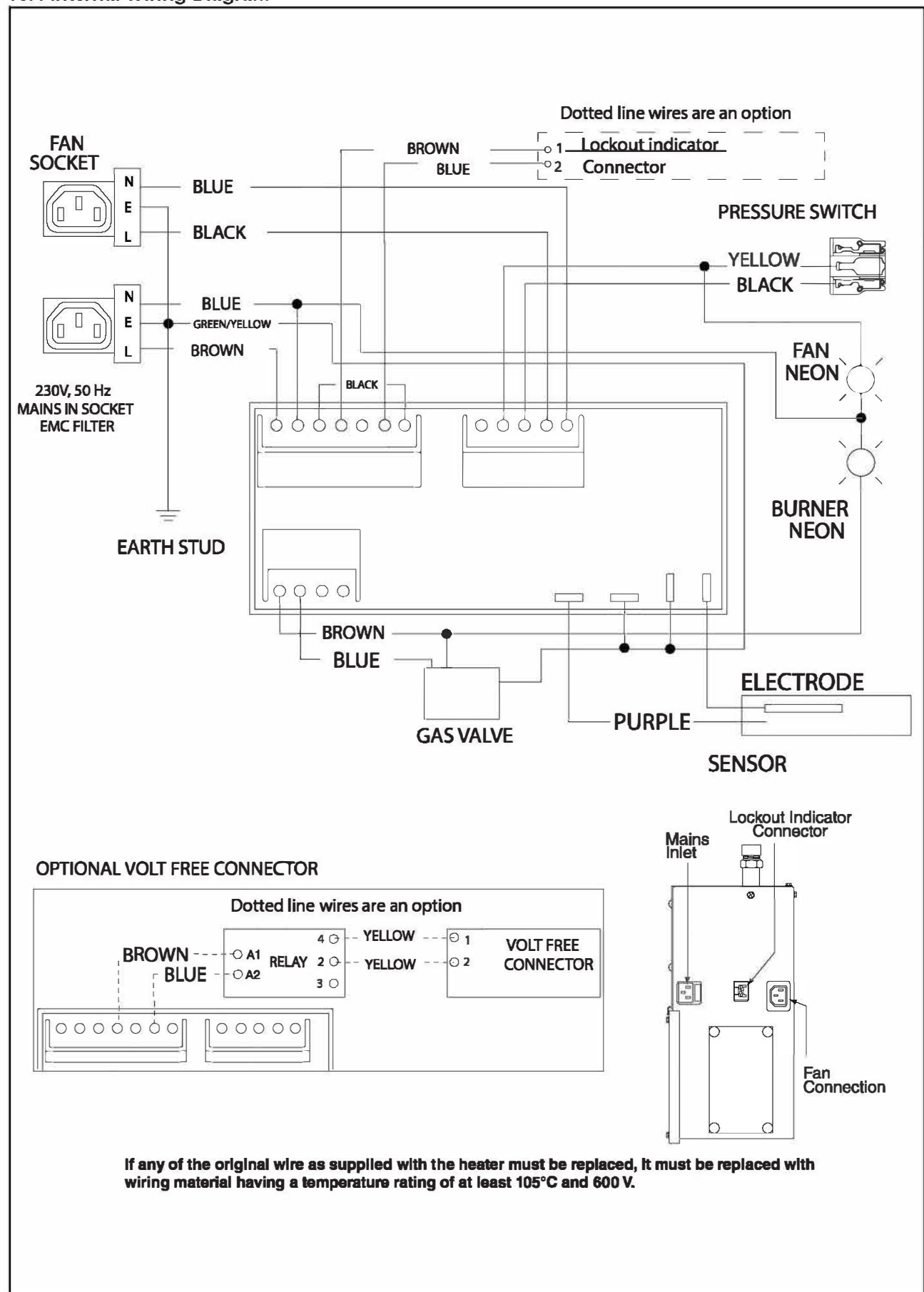
13.2 Typical External Wiring Diagram (Double Linear Option 2)



13.3 Typical External Wiring Diagram (Multiburner)



13.4 Internal Wiring Diagram



SECTION 14: OPERATION





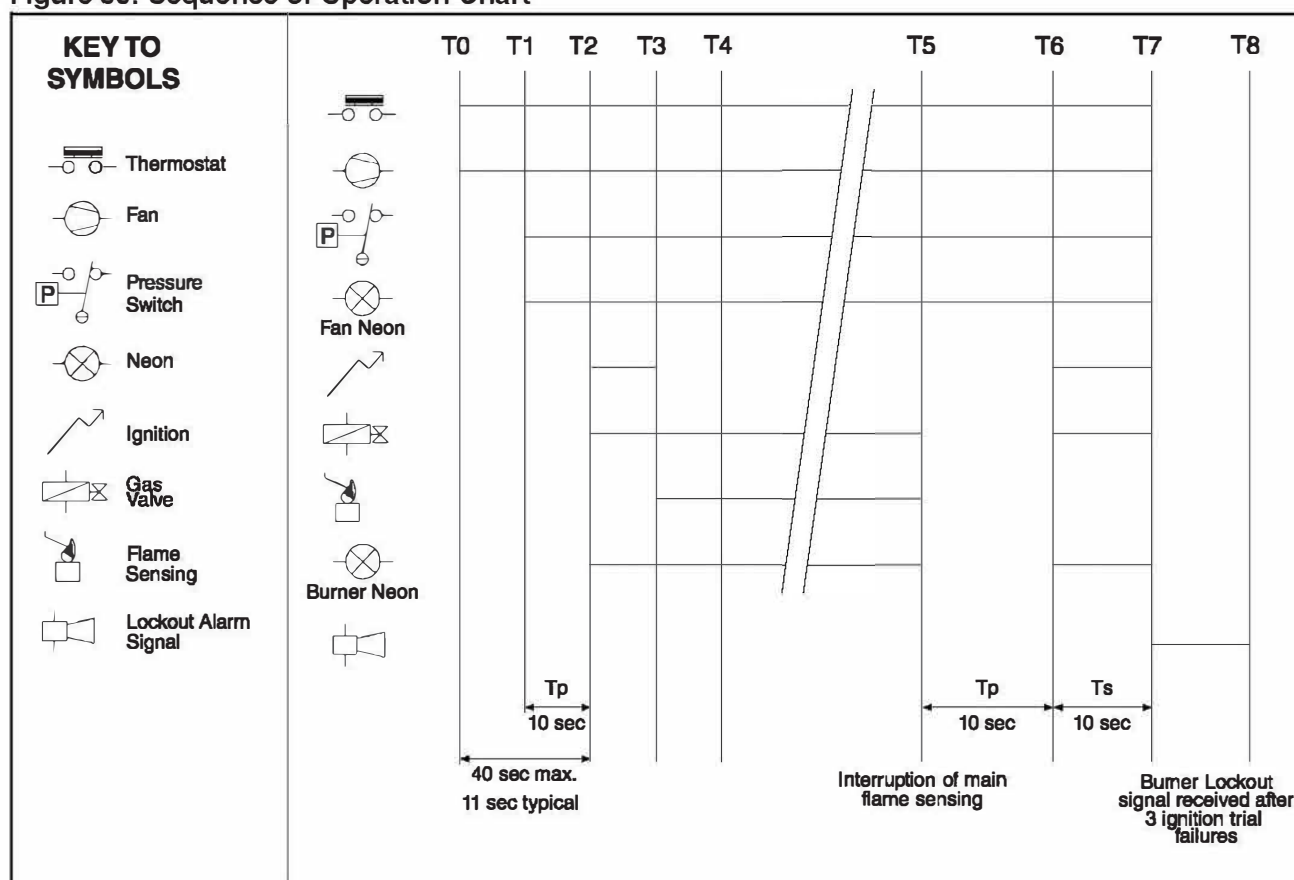
⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard Disconnect electric before service. More than one disconnect switch may be required to disconnect electric from heater. Heater must be connected to a properly earthed electrical source.	Explosion Hazard Turn off gas supply to heater before service.	Burn Hazard Allow heater to cool before service. Tubing may still be hot after operation.	Cut/Pinch Hazard Wear protective gear during installation, operation and service. Edges are sharp.
Failure to follow these instructions can result in death, electric shock, injury or property damage.			

Figure 35: Sequence of Operation Chart



NOTE: If the heater operates for more than 24 hours continuously, the ignition module will automatically recycle the burner to ensure that all safety functions are still in working condition.

14.1 Heater Lockout Indication

In case of flame loss during operation of the heater, the burner control unit goes to lockout mode after three ignition trials. At this stage a signal or closed relay will enable the Combat Heating Solutions Limited controller,

BMS system, etc to indicate precisely which heater has failed. This can be done by two options.

14.1.1 Heater Lockout Indicator by Connector

A 230 V signal is provided which enables the Combat Heating Solutions Limited controller, BMS system, etc. to indicate the heater that has failed. An additional wire has to be installed from the heater lockout indicator connector to the monitoring computer. See *Page 58, Section 13.4.*

14.1.2 Heater Lockout Indicator by Volt Free Connector (Optional)

A volt free contact relay is closed which enables the Combat Heating Solutions Limited controller, BMS system, etc. to indicate the heater that has failed. An additional wire has to be installed from the heater volt free connector to the monitoring computer. See *Page 58, Section 13.4.*

Description	Part Number
Connector male - Volt Free	91324000
Connector female - Volt Free	91324001
Wire Blue 7"	91300004
Wire Brown 7"	91300005
Wire Yellow 12"	91300003
Screw #8 x 3/8 Hex Wshr PHH Type 23	94961406
Base relay P2RF05E	C1050B
Relay G2R1-SN IMO 220 V 10 A	C1049B

14.2 Commissioning - Single Burners [ST, UT, DL].

Establish that a satisfactory purged gas supply and an electrical supply is available to the heater. Ensure that all time clocks and thermostats are set to call for heat.

With the gas supply cut off at the appliance isolating cock and the electrical supply isolated by switching off at the local switch and removing the appliance inlet plug, open the control chamber secured by the two screws. Loosen the sealing screw from the pressure test point and remove the cover cap from the governor.

Turn on the gas supply and connect appliance electrical plug. Ensure that the timer or thermostat, if fitted, are set to call for full gas rate. Switch on at the local switch. The sequence as described should take place. If not, refer to detailed fault finding sequence. When flame is established, check the gas pressure reading and adjust if necessary. Refer to burner data label.

Check the gas pressure at the outlet of the gas valve. See *Page 74, Section 18.10.1* for pressure settings or refer to the data plate.

Switch off the electrical supply (shutting down the heater), remove pressure gauge - tighten pressure test point screw, ensuring a tight gas seal. Replace governor cover cap. Close burner side cover.

14.3 Commissioning (Multiburner)

1. Establish that a satisfactory purged gas supply and an electrical supply is available to the heater.
2. ENSURE that all the dampers are in the fully open position.
3. With the gas supply off at each of the burners and the electrical supply isolated, open the control chamber secured by two self tapping screws.

4. Ensure that all time clocks and thermostats are set to call for heat.

5. Switch on the electrical supply at the main isolator. This will start the exhaust fan.

6. Balancing Cold Vacuum

Check each burner vacuum by connecting an inclined pressure gauge to the tee on the pressure switch inlet side in the burner. Adjust the damper so that the vacuum is 1.9 mbar. Repeat for each burner.

7. Starting at the end burner (furthest from the exhaust fan), with the inclined pressure gauge connected as described above. Turn on the gas supply and connect appliance electrical plug, reset the pressure switch by removing vacuum from the inlet side of the pressure switch waiting several seconds and reconnecting. The start up sequence described on *Page 59, Section 14* should take place. If not, refer to detailed fault finding sequence. When flame is established, check the gas pressure reading and adjust if necessary. See data label.

Check the gas pressure at the outlet of the gas valve. See *Page 74, Section 18.10.1* for pressure settings or refer to the data plate.

Switch off the electrical supply (shutting down the heater), remove pressure gauge - refit pressure test point screw, ensuring a tight gas seal. Replace governor cover cap.

Repeat this procedure for each burner in the system.

Close the control chamber and secure with two sheet metal screws.

8. Balancing Hot Vacuum

Reconnect all the burners on the system and allow them to reach full operating temperature (approximately 20 minutes). Return to each burner and recheck the hot vacuum at the tee on the inlet to the pressure switch. Readjust the damper so that the hot vacuum of 1.5 mbar (2.0 mbar for CMP40EF) is achieved and lock the damper in position.

14.4 System Checks

Switch on again at the local switch to ensure smooth ignition. Carry out the following system checks:

When running, turn off the gas supply at the appliance. The heater will immediately shut down followed by three ignition attempts followed by lockout.





Linear and Double Linear only:

When running, disconnect the fan plug from the burner. The unit should shut down within three seconds, proving operation of the pressure switch.

14.5 User Instructions

After satisfactory testing, ensure that the client is fully aware of the operation of the system. Bring this manual to the attention of the user or purchaser; instruct them in the safe operation of the heater(s). Advise the user that if the system is unflued, any reduction in the natural ventilation of the building may require a flue to be fitted, or additional ventilation grilles will be required.

SECTION 15: SERVICING INSTRUCTIONS

⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard Disconnect electric before service. More than one disconnect switch may be required to disconnect electric from heater. Heater must be connected to a properly earthed electrical source.	Explosion Hazard Turn off gas supply to heater before service.	Burn Hazard Allow heater to cool before service. Tubing may still be hot after operation.	Cut/Pinch Hazard Wear protective gear during installation, operation and service. Edges are sharp.
Failure to follow these instructions can result in death, electric shock, injury or property damage.			

IMPORTANT: Never use the heater as a support for ladders or other access equipment. Always test for gas soundness with a suitable detection fluid after completing any servicing or exchange of gas carrying component. On completion of any service/fault finding tasks which require the breaking and remaking of electrical connections, the checks:- A:Earth Continuity, B:Polarity and C:Resistance to Earth must then be repeated.

15.1 Annual Procedure

Carry out the following procedure annually. The preferred time would be immediately before the winter heating period. If very dirty conditions arise, it may be necessary to carry out this procedure more often. If the unit takes in air through an air duct or filter assembly, more frequent service may be necessary.

15.1.1 Burner and Fan Removal

Isolate the heater from the gas and electrical supplies. Remove the fan plug from the burner. Unscrew the securing screws on the burner flange. The burner can now be removed. Take care not to disturb the gasket on the flanged burner tube. Unscrew the securing screw on the fan flange spigot. The fan can now be removed.

15.1.2 Burner and Fan Removal Maintenance

Remove the fan and burner independently to floor level and clean both items internally using a soft brush and compressed air, if available. Take care not to damage the internal parts of the burner. Check fan impeller for cleanliness and free rotation.

The electrodes are an integral part of the burner. To check spark gap, remove the securing screws on the electrode and withdraw it ensuring the gasket is not damaged. Spark gap on electrode should be approximately 3 mm.

15.1.3 Tube and Reflector Maintenance

With burner and fan removed, clean the outer surfaces of the tubes using a brush and wipe the inner surface of the reflector with a soft damp cloth - use a household detergent if necessary. Never use abrasive cleaners on the reflectors. Reassemble the burner and fan in reverse

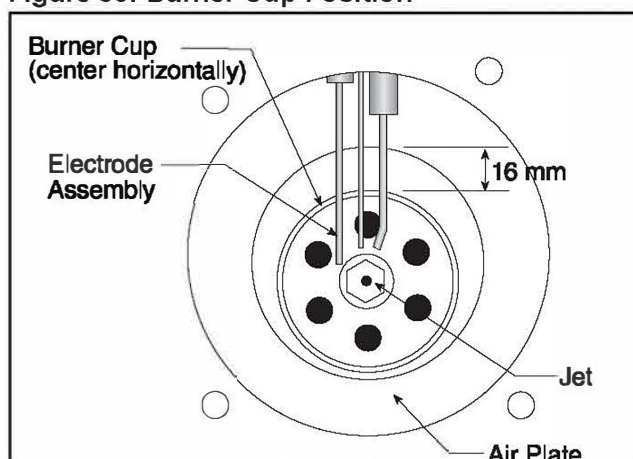
order. Carry out the Testing Procedure. See Page 60, Section 14.2.

15.2 Component Removal

First, isolate the heater from the gas and electrical supplies. Entry to the burner assembly is gained by removing the door screws and opening the hinged side cover. Entry to the combustion chamber is gained by removing the combustion chamber cover.

15.2.1 Electrode

Figure 36: Burner Cup Position



15.2.2 Burner Head/Injector Jet

When the cover is removed completely, the burner assembly is exposed. Unscrew the burner cup. Remove brass injector jet (orifice). Replace in reverse sequence.

15.2.3 Solenoid Valve/Governor

Remove burner head. Remove screws securing the solenoid/governor body bracket. Withdraw the four wires between the solenoids. The solenoid/governor and fittings can now be withdrawn from the compartment. The solenoid(s) can be removed from the body by unscrewing central screw. Replace in reverse sequence. Note: Earth is green/yellow.

15.2.4 Automatic Flame Control Unit

Remove black ignition lead. Withdraw the connectors. Remove two screws from the cover. Replace if faulty. Refit in reverse sequence.

15.2.5 Pressure Switch

Disconnect the two silicone tubes. Remove wires from the three blades. Remove two screws which secure the pressure switch to the burner. Remove pressure switch. Replace pressure switch, if faulty, and refit in reverse sequence ensuring that the rubber tubes are reconnected to the switch correctly.

Note: Wires fitted as follows:

- NO - Yellow
- NC - White
- Common - Black

15.2.6 Neons

Remove the two push on connectors and remove the neons by pushing downwards. Replace in reverse sequence.

15.3 Maintenance Checklist


Installation Code and Annual Inspections:





All installation and service of Combat Heating Solutions Limited equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Combat Heating Solutions Limited and conform to all requirements set forth in the Combat Heating Limited manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Combat Heating Solutions Limited recommends that a qualified contractor conduct, at a minimum, annual inspections of your Combat Heating Limited equipment and perform services where necessary, using only replacement parts sold and supplied by Combat Heating Limited.

The Vicinity of the Heater	<p>Do not store or use flammable objects, liquids or vapours near the heater. Immediately remove these items if they are present.</p> <p><i>See Page 7, Section 3.</i></p>
Vehicles and Other Objects	<p>Maintain the clearances to combustibles.</p> <p>Do not hang anything from, or place anything on, the heater.</p> <p>Make sure nothing is lodged underneath the reflector, in between the tubes or in the decorative or protective grilles (included with select models).</p> <p>Immediately remove objects in violation of the clearances to combustibles.</p> <p><i>See Page 7 Section 3.</i></p>
Reflector	<p>Support reflector with hanger and support strap.</p> <p>Reflector must not touch tube.</p> <p>Make sure there is no dirt, sagging, cracking or distortion.</p> <p>Do not operate if there is sagging, cracking or distortion.</p> <p>Make sure reflectors are correctly overlapped. <i>See Page 25, Section 6.6.1. or Page 36, Section 7.8.1.</i></p> <p>Clean outside surface with a damp cloth.</p>
Vent Pipe	<p>Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust.</p> <p>Remove any carbon deposits or scale using a wire brush.</p> <p><i>See Page 51 Section 11.</i></p>
Outside Air Inlet	<p>Inlet must be intact. Look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust. Clean and reinstall as required.</p>

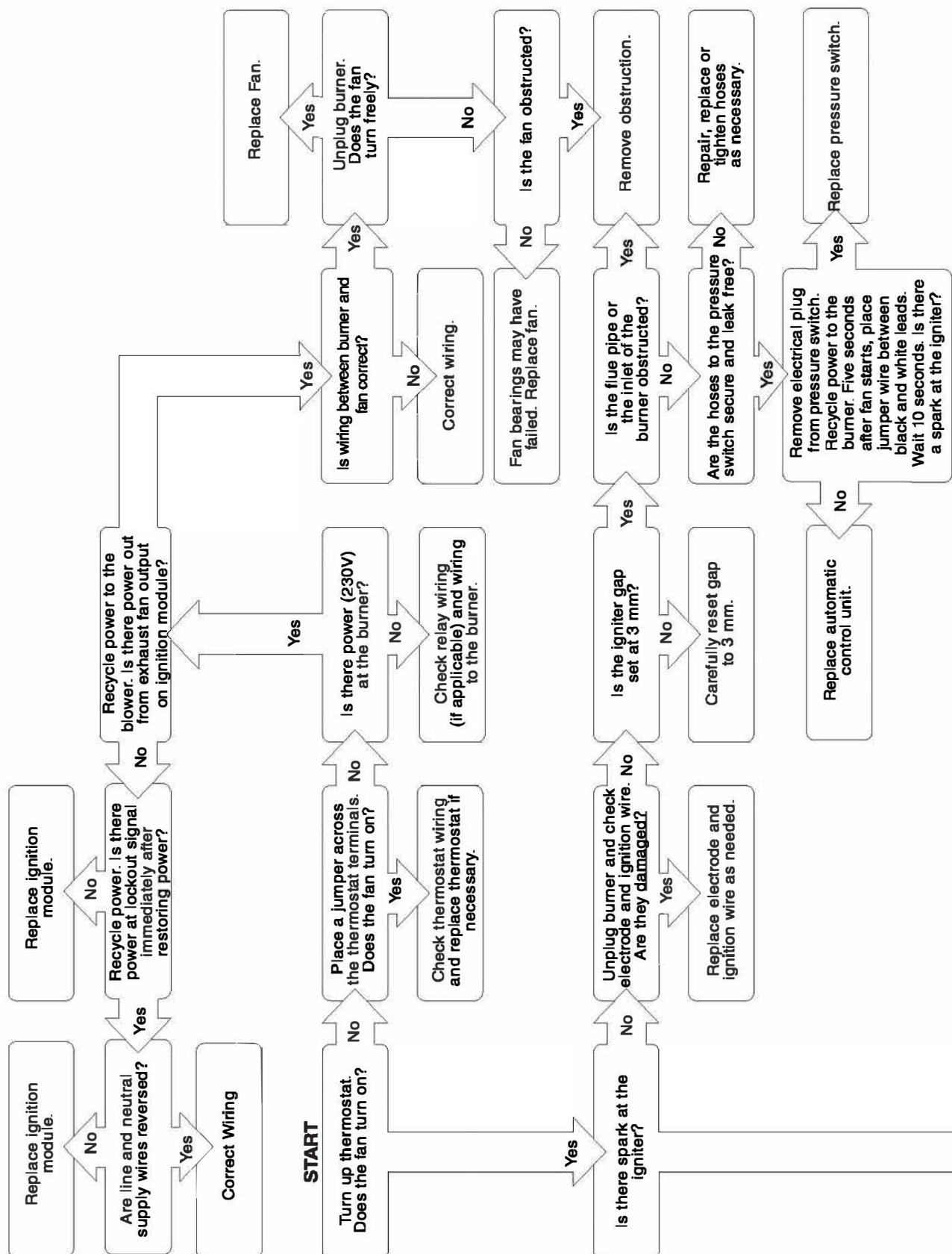
Tubes	<p>Make sure there are no cracks.</p> <p>Make sure tubes are connected and suspended securely. <i>See Page 13, Section 5.</i></p> <p>Make sure there is no sagging, bending or distortion.</p>
Gas Line	<p>Check for gas leaks. <i>See Page 54, Section 12.</i></p>
Burner Observation Window	<p>Make sure it is clean and free of cracks or holes.</p> <p>Clean and replace as required.</p>
Blower Scroll, Wheel and Motor	<p>Compressed air or a vacuum cleaner may be used to clean dust and dirt.</p>
Burner Cup and Orifice	<p>Clear of obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.</p>
Electrode	<p>Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode.</p> <p>The electrode gap should be 3 mm.</p>
Thermostat	<p>There should be no exposed wire or damage to the thermostat. <i>See Page 56, Section 13.</i></p>
Suspension Points	<p>Make sure the heater is hanging securely.</p> <p>Look for signs of wear on the chain or ceiling.</p> <p><i>See Page 13, Section 5.</i></p>
Sports Hall Guard, Decorative and Protective Grilles (optional)	<p>The grille must be securely attached. If the grille is loose or off, contact a contractor qualified in the installation and service of gas-fired heating equipment for repair.</p> <p>Check that side reflector extensions are installed correctly and secured in place if necessary (decorative grille only).</p> <p><i>See Page 44, Section 10.1 and Page 46, Section 10.3.3.</i></p> <p>Make sure shield is installed correctly and secured in place if necessary. (Decorative grille only.) <i>See Page 46, Section 10.3.2.</i></p>
Wall Tag	<p>If a wall tag is present, make sure it is legible and accurate. Please contact Combat Heating Solutions Limited or your Combat[®] Heating Solutions Limited independent distributor if you need a wall tag. <i>See Page 6, Section 2.1.</i></p>
Safety Labels	<p>Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Combat Heating Solutions Ltd or your Combat[®] Heating Solutions Ltd. independent distributor to obtain replacement signs or labels. <i>See Page 4, Figure 1 through Page 5, Figure 2.</i></p>

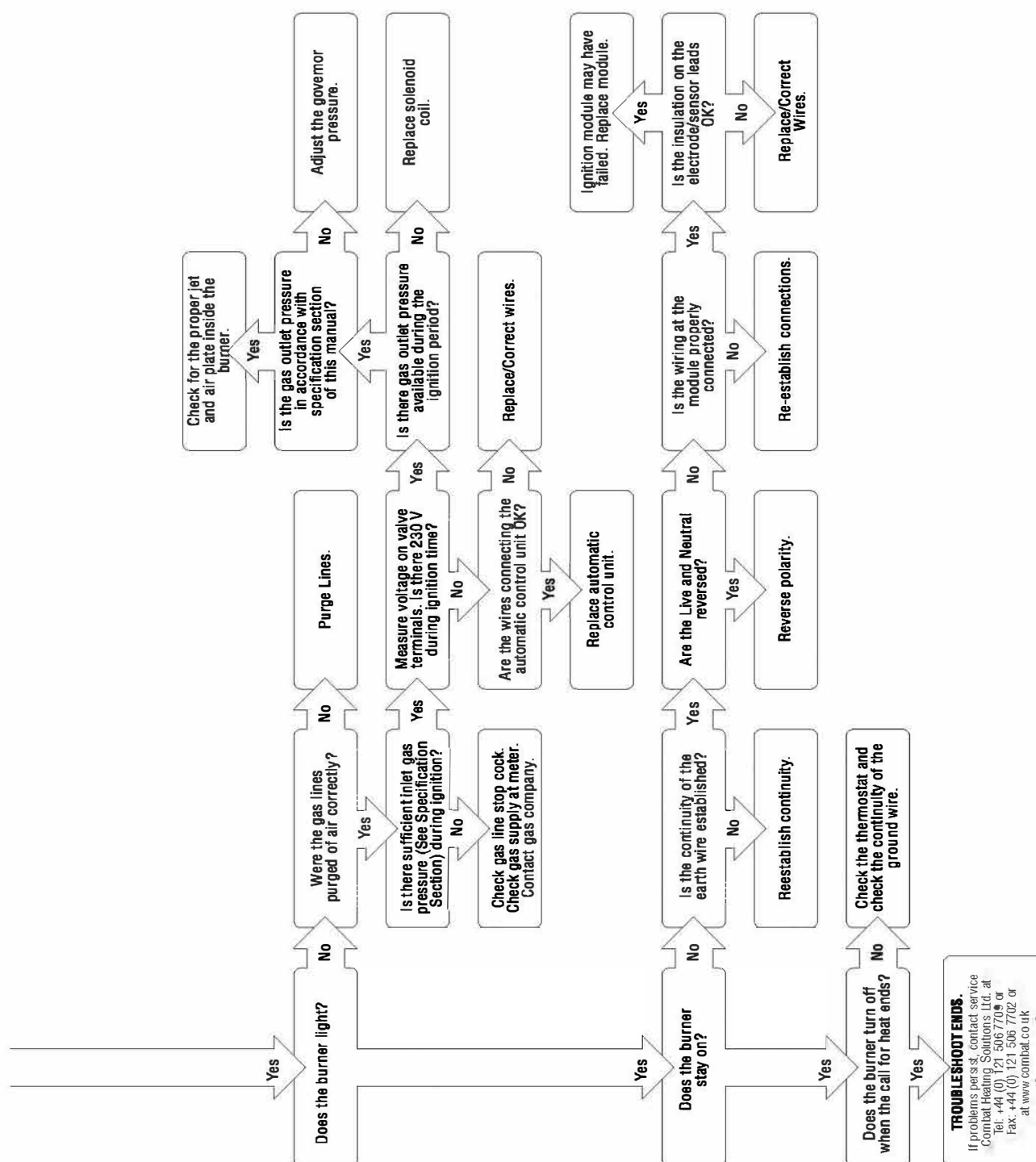
SECTION 16: TROUBLESHOOTING

⚠ DANGER

<p style="text-align: center;">Electrical Shock Hazard</p> <p>Disconnect electric before service.</p> <p>Heater must be properly earthed.</p> <p>Failure to follow these instructions can result in death or electrical shock.</p>

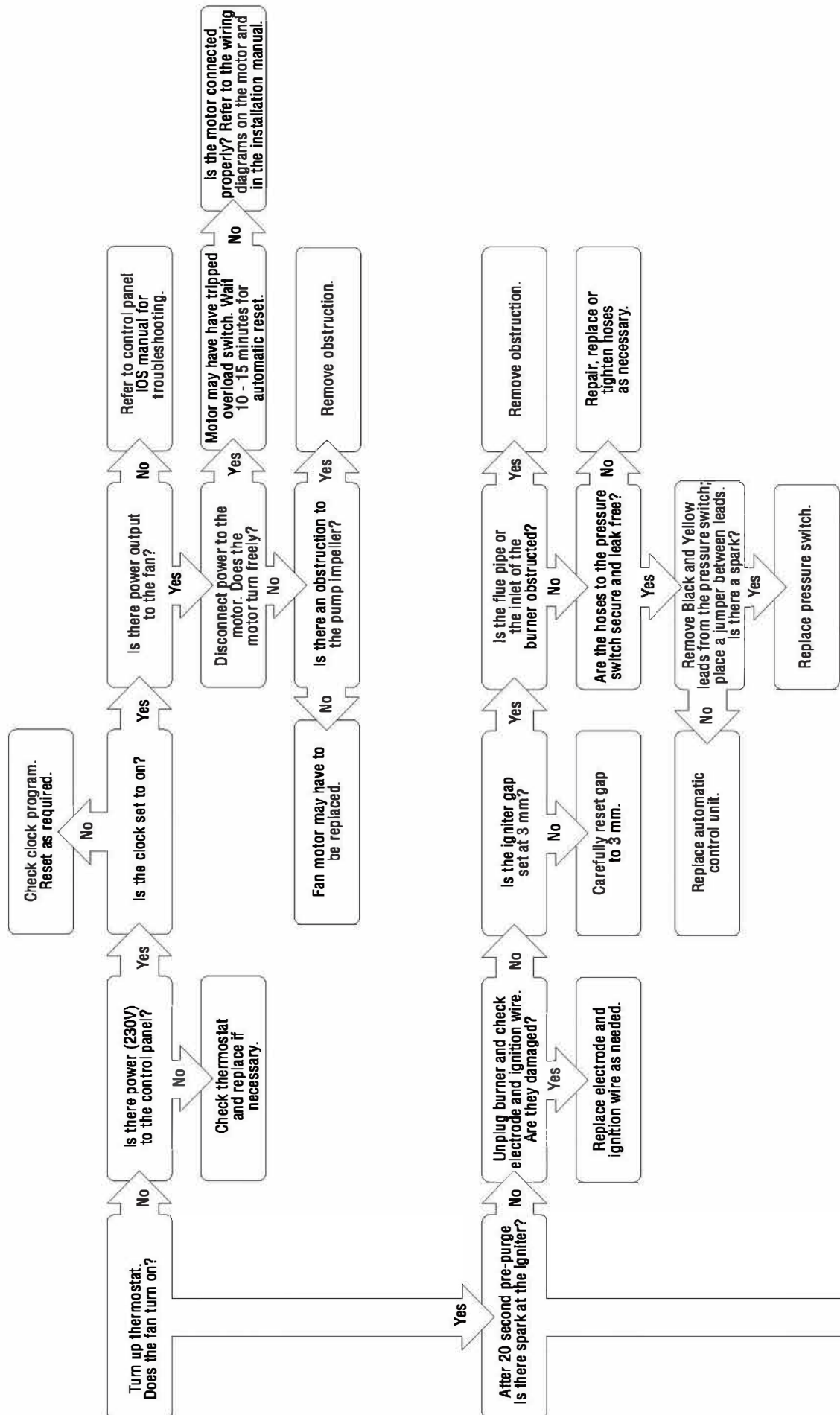
⚠ WARNING			
			
<p style="text-align: center;">Fire Hazard</p> <p>Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.</p> <p>Some objects will catch fire or explode when placed close to heater.</p>	<p style="text-align: center;">Explosion Hazard</p> <p>Turn off gas supply to heater before service.</p>	<p style="text-align: center;">Burn Hazard</p> <p>Allow heater to cool before service.</p> <p>Tubing may still be hot after operation.</p>	<p style="text-align: center;">Cut/Pinch Hazard</p> <p>Wear protective gear during installation, operation and service.</p> <p>Edges are sharp.</p>
<p style="text-align: center;">Failure to follow these instructions can result in death, injury or property damage.</p>			

16.1 Troubleshooting Flow Chart (Linear, Double Linear and U-Tube)

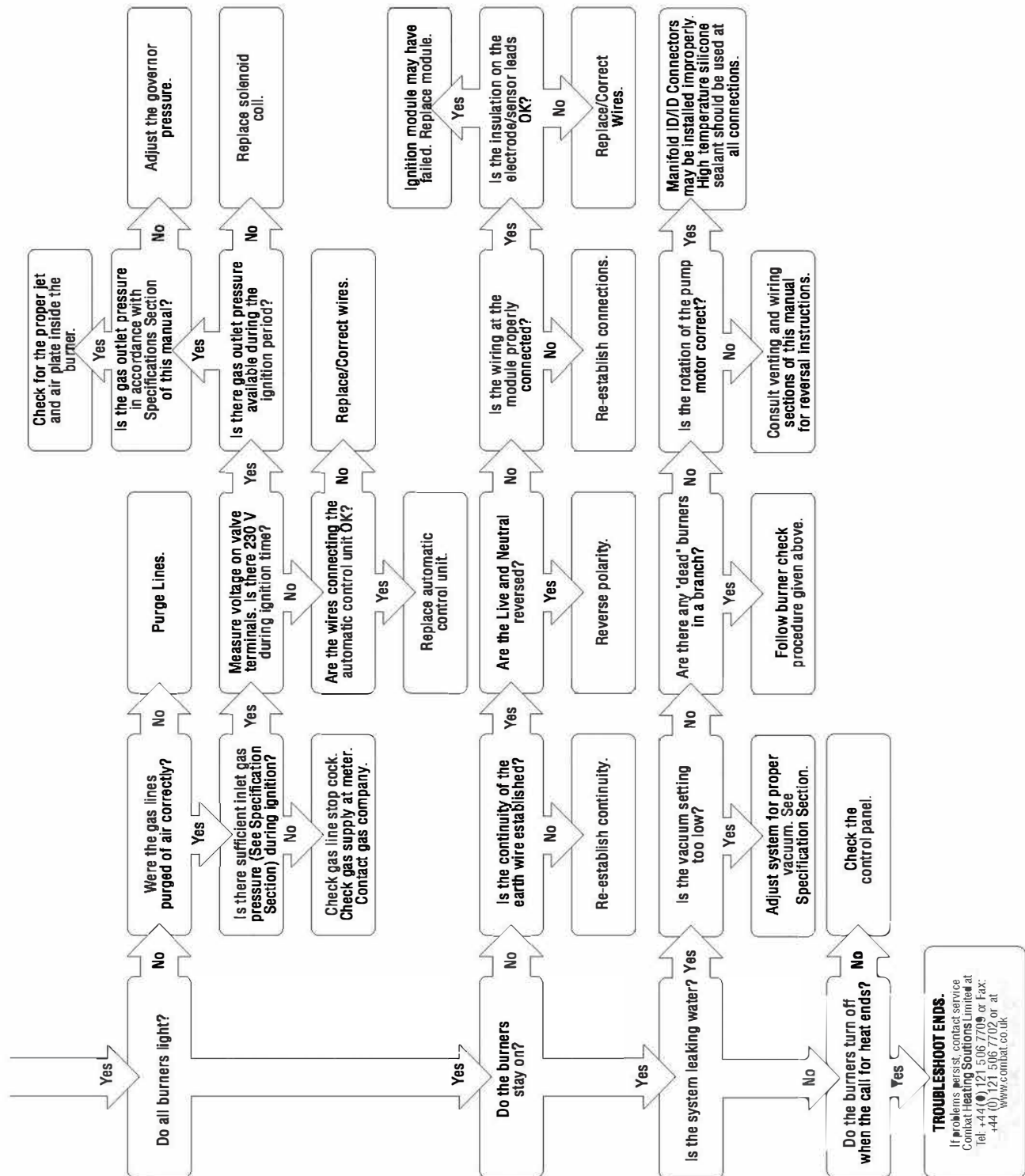




2 Troubleshooting Flow Chart (Multiburner)

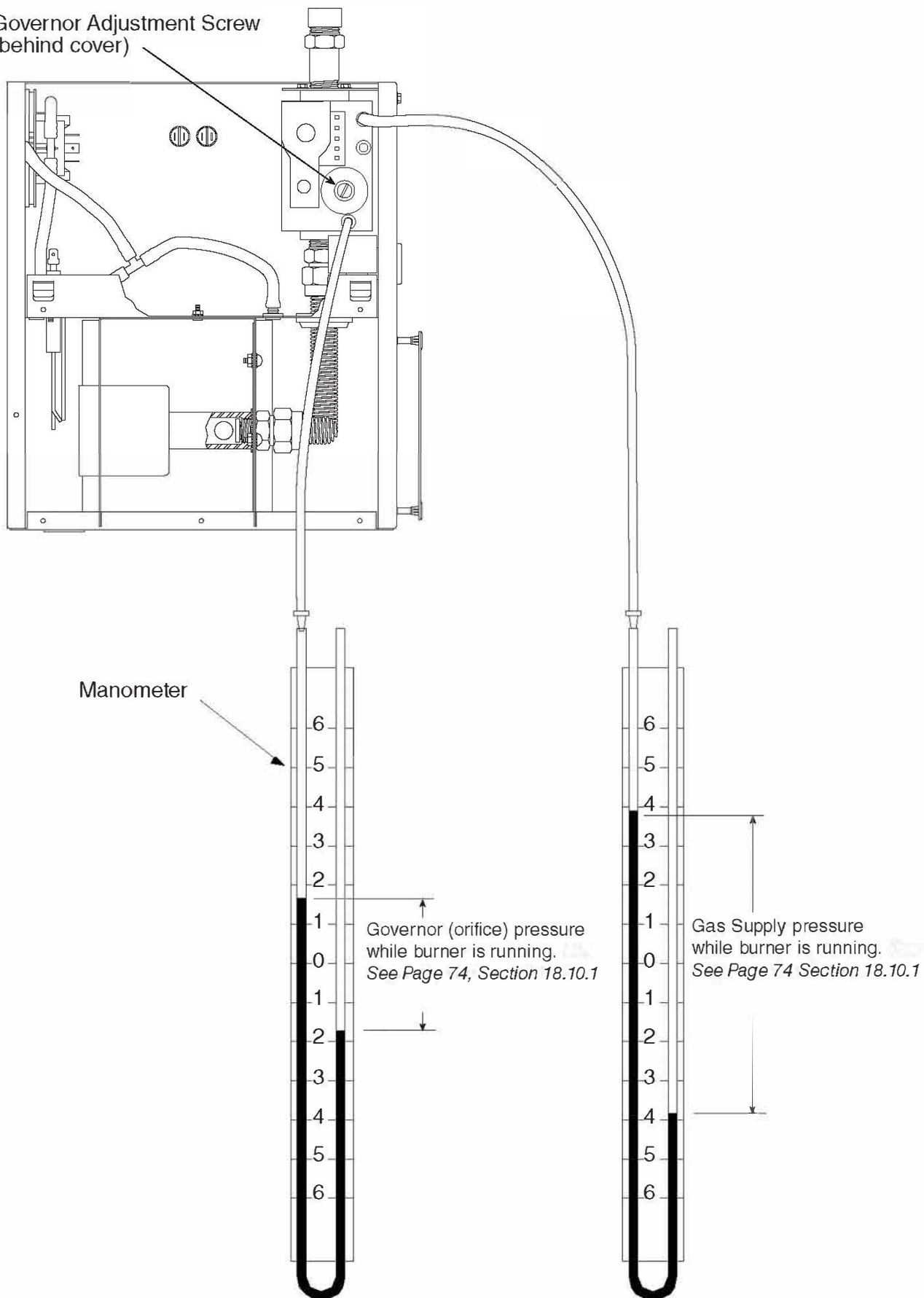


Troubleshooting Flow Chart (Multiburner)



16.3 Manifold Gas Pressure Setting

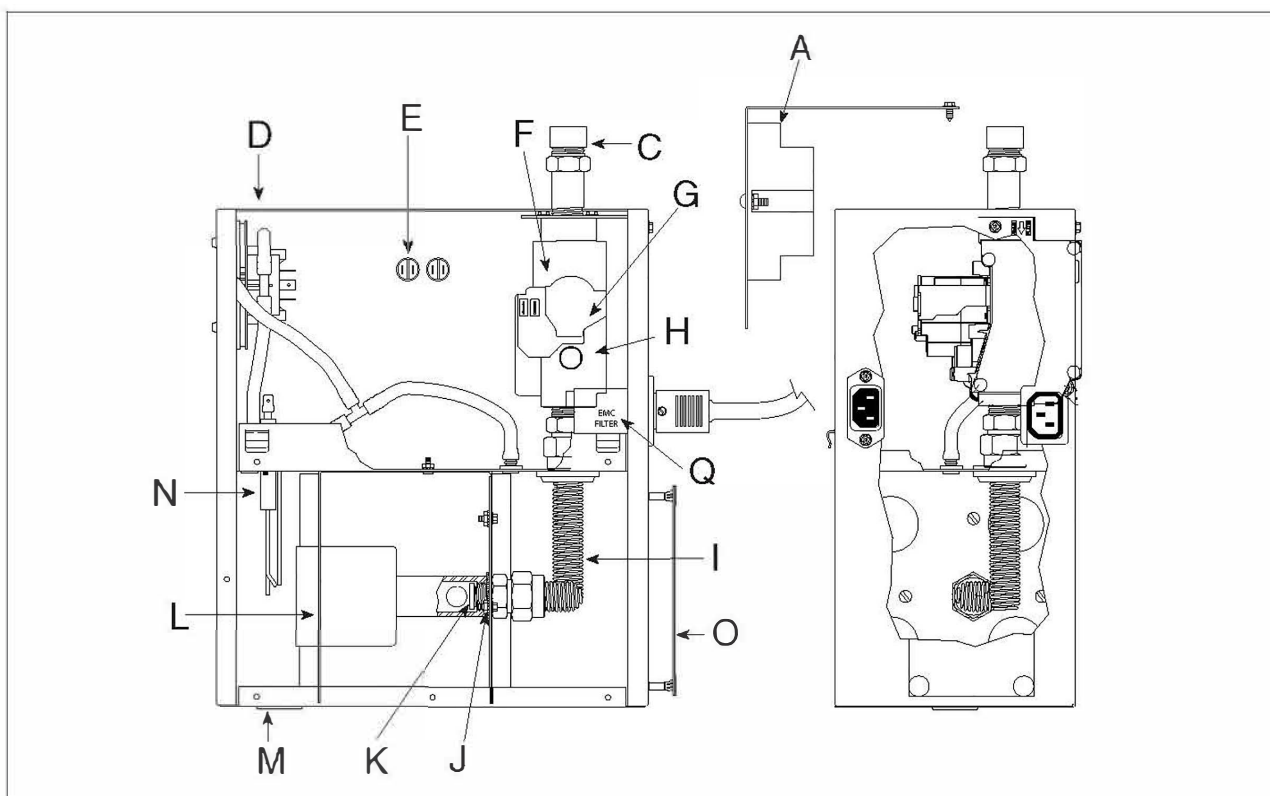
Governor Adjustment Screw
(behind cover)



SECTION 17: REPLACEMENT PARTS

⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard	Explosion Hazard	Fire Hazard	Carbon Monoxide Hazard
<p>Use only genuine Combat Heating Solutions Limited replacement parts per this installation, operation and service manual.</p> <p><u>Failure to follow these instructions can result in death, electric shock, injury or property damage.</u></p>			

See warnings and important information before removing or replacing parts. After any maintenance or repair work, always test fire the heater in accordance with the start-up instructions on *Page 59 Section 14* to help ensure all safety systems are in working order before leaving the heater to operate. Minor faults may be traced by using the troubleshooting charts on *Page 65, Section 16 through Page 68 Section 16.3*.



Item	Description	Part Number	Item	Description	Part Number
A	Automatic Control Unit	90438704	O	Dust Arrest Baffle Plate	07230000
C	Flex Line Adapter	91220700	Q	Mains in socket with EMC Filter	90438902
D	Pressure Switch for CMP25 - CMP55, CMP50, (0.23" w.c.)	90439801	N/S	Ignition Wire	90427704
	CMP15 and CMP20 (0.32" w.c.)	90439802			
	CMP30 and CMP35 (0.41" w.c.)	90439803			
	CMP45 (0.47" w.c.)	90439804			
	CMP40 (0.79" w.c.)	90439808	N/S	Outside Air Kit	07260000
	CMP25 (0.59" w.c.)	90439809	N/S	Flue Collar 100 mm	91911700
E	Amber Neon Lamp	91320602	N/S	Outside Air Mounting Plate	07261000
F	Gas Valve	90033106	N/S	#8 x 3/8 Washer Head Screw	94118106
G	Governor Screw	N/A	N/S	Burner Tube Gasket	02568200
H	Outlet Pressure Tap	N/A	N/S	Wire Purple 12.5"	07250007
I	Flex Manifold	03090702T	N/S	Wire Harness CMP Gas Valve OR	07250006
J	Star Washer	96212100		Wire Harness CMP Ground	07250008
K	Jet Orifice (See Page 74, Section 18.10.1)	N/A		Wire Harness CMP Valve	07250009
L	Burner Cup Assembly	03020100	N/S	Wire Harness CMP Pressure Switch	07250005
M	Mica Window Assembly	02552303	N/S	Wire Harness CMP Main Power	07250004
N	Electrode Assembly	90427403	N/S	Lockout Indicator Connector (male)	91324000
N/S	Electrode Gasket	02558501	N/S	Lockout Indicator Connector (female)	91324001

Notes:

SECTION 18: SPECIFICATIONS

18.1 Material Specifications

18.1.1 Combustion and Tubes

100 mm dia. 16 gauge heat treated aluminised mild steel.

18.1.2 Reflectors

NS3 H14 aluminium

18.2 Heater Specifications

18.2.1 Sequence Controller

Fully automatic, three try, direct spark, 100% shut off ignition flame rectification module.

18.2.2 Electrical

Rating: 230V, 50 Hz, 1 Ø, 1 A

Connection: 3 pin moulded plug

18.2.3 Gas Supply

Connection: Rc1/2 (1/2" BSP int)

Natural Gas:-

Minimum Inlet 1.13 kPa

Maximum Inlet 5.0 kPa

Universal LPG:-

Minimum Inlet 2.75 kPa

Maximum Inlet 5.0 kPa

18.3 Venting Specifications

18.3.1 Fans

CMP-15, 20, 25, 30..... Model: Torin DSF 133-42

CMP-25, 30, 35,

CMP-35, 40, 45..... Model: Torin DSA 524-202

CMP-40, 45,

50, CMP-50.....Model: McMillan N1398A

CMP30DL, 40DL, CMP50DL,

60DL, 70DL Model: McMillan N1398A

Multiburner Model: Airflow 83 BWLG

..... Model: Airflow 90 BWTL

Consult the manufacturer for availability of alternate fans.

18.3.2 Flue

When fitted, the flue must be 100 mm, or greater in diameter, and must conform to National Codes. The flue must be self supporting. Inlet must be 100 mm diameter.

Multiburner: Flue will be 100mm or 150mm diameter and sized to suit the arrangement. Connection to the fan inlet cone would be 150mm diameter only. Refer to Figure 26 for a typical arrangement. Flue material must conform to National Codes. The flue must be self supporting.

18.4 Suspension Specifications

Hang heater with materials with a minimum working load of 33 kg.

18.5 Controls Specifications

Time switches, thermostats, etc. can be wired into the electrical supply. External controls supplied as an optional extra.

18.6 Environment

The heater is limited to operate in an ambient temperature range of 0° C – 32° C (32° F – 86° F) with a maximum relative humidity of 95%.

18.7 Linear Heater

	CMP15ST	CMP20ST	CMP25ST	CMP30ST	CMP35ST	CMP40ST	CMP45ST	CMP50ST
Input - Gross (kW)	15	20	25	30	35	40	45	50/51
Input - Net (kW)	13.5	18	22.5	27	31.5	36	40.5	45/46
Tube Length (mm)	6096	9144	9144	12192	12192	12192	15240	15240
Overall Heater Length (mm)	6661	9709	9709	12757	12767	12767	15815	15850
Weight (kg)	42	57	57	75	75	75	90	97
Heated Area (m²)	20-160	30-210	40-265	50-315	55-370	65-420	70-475	80-525
Minimum Installation Height(mm)	3500	3500	3500	3500	4600	5000	5000	5000
Recommended Installation Height (mm)	3500	3600	3900	4200	4800	5500	6700	7600

18.8 Double Linear Heater

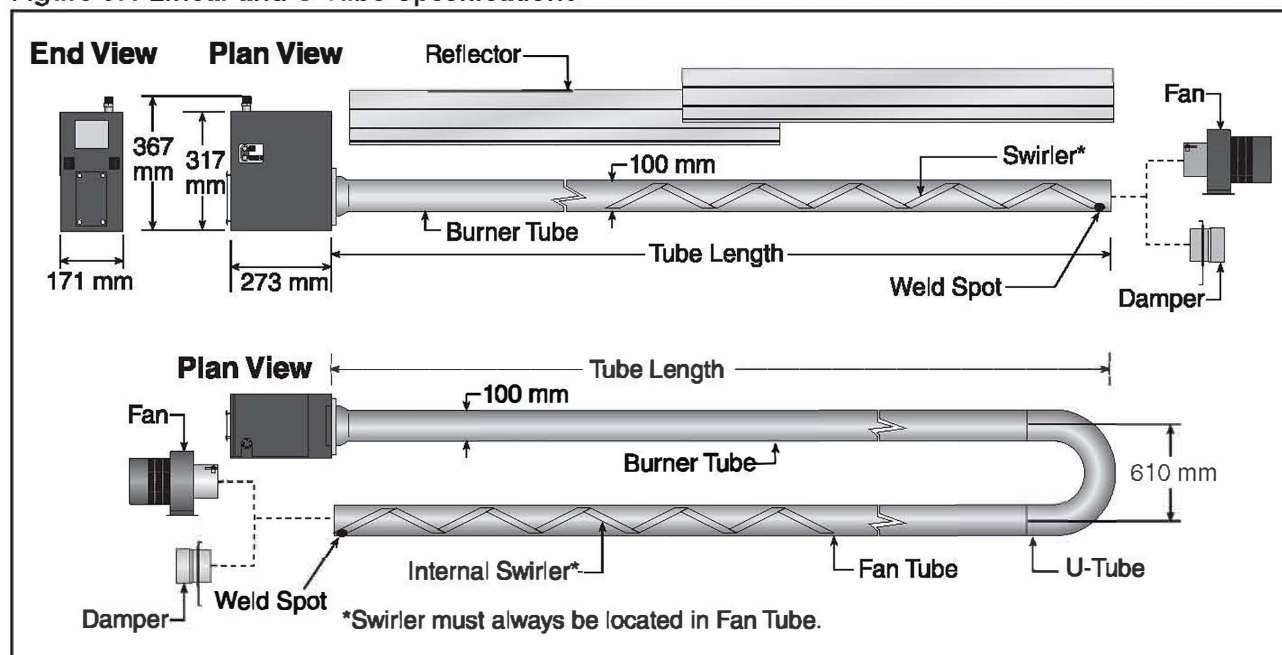
	CMP30DL	CMP40DL	CMP50DL	CMP60DL	CMP70DL
Input - Gross (kW)	30	40	50	60	70
Input - Net (kW)	27.5	36	45	54	63
Tube Length (mm)	12802	18898	18898	24994	24994
Overall Heater Length (mm)	13462	19558	19558	25654	25654
Weight (kg)	85	115	122	157	157
Heated Area (m²)	50-315	65-420	80-525	100-630	110-740
Minimum Installation Height (mm)	3500	3500	3500	3500	4600
Recommended Installation Height (mm)	3500	3600	3900	4200	4800

18.9 U-Tube Heater

	CMP15UT	CMP20UT	CMP25UT	CMP30UT	CMP35UT	CMP40UT	CMP45UT	CMP50UT
Input - Gross (kW)	15	20	25	30	35	40	45	50
Input - Net (kW)	13.5	18	22.5	27	31.5	36	40.5	45
Tube Length (mm)	3531	5055	5055	6579	6579	6579	8103	8103
Overall Heater Length (mm)	3822	5346	5346	6870	6870	6870	8394	8394
Weight (kg)	51	65	65	81	81	81	100	107
Heated Area (m²)	20-160	30-210	40-265	50-315	55-370	65-420	70-475	80-525
Minimum Installation Height (mm)	3500	3500	4000	4700	5000	5000	5000	5000
Recommended Installation Height (mm)	3500	3600	4000	4700	5000	5500	6700	7600

18.10 Burner Specifications

Figure 37: Linear and U-Tube Specifications



18.10.1 Standard Burner Specifications

	CMP15	CMP20	CMP25	CMP30	CMP35	CMP40	CMP45	CMP50
Burner Airplate ID Number	20	15	14	5	6	5	6	10
Jet Numbers - Natural Gas	#30	3.8 mm	#20	#16	#9	#5	#2	B
Jet Numbers - Universal LPG	#46	2.3 mm	#37	#33	3.1 mm	3.3 mm	#29	#26
Gas Consumption** Natural (m³/h)	1.43	1.91	2.38	2.86	3.36	3.81	4.29	4.86
Gas Consumption** ULPG (m³/h) [kg/h]	0.56 [1.08]	0.75 [1.44]	0.94 [1.80]	1.13 [2.16]	1.32 [2.52]	1.51 [2.88]	1.69 [3.25]	1.88 [3.61]

Gas Supply and Test Point Pressures:

Inlet supply [Valve inlet Test Point] Pressure:

Natural Gas = 1.13 kPa

Universal LPG = 2.75 kPa

Maximum supply pressure; A;; Models, all gases = 5.0 kPa

Manifold [Valve outlet Test Point] Pressure:



Natural Gas = 0.75 kPa

Universal LPG = 2.49 kPa

** Based on gross calorific value

Attach this information to a wall near the Combat Heating Solutions Limited heater.

Combat[®] Heating Solutions Ltd

OPERATING INSTRUCTIONS	 WARNING
<ol style="list-style-type: none"> 1. STOP! Read all safety instructions on this information sheet. 2. Open the manual gas valve in the heater supply line. 3. Turn on electric power to the heater. 4. Set the thermostat to desired setting. 	 <p>Fire Hazard</p> <p>Keep all flammable objects, liquids and vapours the minimum required clearances to combustibles away from heater.</p> <p>Some objects will catch fire or explode when placed close to heater.</p> <p>Failure to follow these instructions can result in death, injury or property damage.</p>
TO TURN OFF THE HEATER	
<ol style="list-style-type: none"> 1. Set the thermostat to off or the lowest setting. 	
IF THE HEATER WILL NOT OPERATE, TO ENSURE YOUR SAFETY, FOLLOW THESE INSTRUCTIONS TO SHUT DOWN YOUR HEATER	
<ol style="list-style-type: none"> 1. Set the thermostat to off or the lowest setting. 2. Turn off electric power to the heater. 3. Turn off the manual gas valve in the heater supply line. 4. Call your registered installer/contractor qualified in the installation and service of gas-fired heating equipment. 	

Maintain _____ clearance to the side and _____ clearance below the heater from vehicles and combustible materials.

Unit 20 Red Mill Trading Estate,

Service Tel: +44 (0) 121 506 7709

Rigby Street, Wednesbury,

Service Fax: +44 (0) 121 506 7702

West Midlands, WS10 0NP. UK

E-Mail: uksales@combat.co.uk

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www.combat.co.uk

Installation Code and Annual Inspection.

All installation and service of Combat Heating Solutions Ltd. equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Combat Heating Solutions Ltd. and conform to all requirements set forth in the Combat Heating Solutions Ltd. manuals and all applicable governmental authorities pertaining to installation, service, operation and labelling of the equipment. To help facilitate optimum performance and safety, Combat Heating Solutions Ltd. recommends that a qualified contractor conduct, at a minimum, annual inspections of your Combat Heating Solutions Ltd. equipment and perform services where necessary, using only replacement parts sold and supplied by Combat Heating Solutions Ltd.

Further Information

Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through Combat Heating Solutions Ltd. representatives. Please contact us for any further information you may require, including the Installation, Operations and Service Manual.

This product is not for residential use.

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