

# Combat<sup>®</sup>

## Compact Tubular Unit Heaters Installation, Commissioning, Operation & Service Manual

Models CTCU 7

CTCU 11

CTCU 15

CTCU 22

CTCU 27

CTCU 32



### FOR YOUR SAFETY

*If you smell gas:*

1. Open windows.
2. **DO NOT** try to light any appliance.
3. **DO NOT** use electrical switches.
4. **DO NOT** use any telephone in your building.
5. Extinguish any open flame.
6. Leave the building.
7. Immediately call your local gas supplier after leaving the building. Follow the gas supplier's instructions.
8. If you cannot reach your gas supplier, call the Fire Department.

### **WARNING**



#### Fire Hazard

Keep all flammable objects, liquids and vapours the minimum required clearances to combustibles away from heater.

Some objects will catch fire or explode when placed close to heater.

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

### **WARNING**

Improper installation, adjustment, alteration, service or maintenance can result in death, injury or property damage. Read the installation, operation and service manual thoroughly before installing or servicing this equipment.

Installation must be done by a registered installer/contractor qualified in the installation and service of gas-fired heating equipment or your gas supplier.

#### Installer

Please take the time to read and understand these instructions prior to any installation. Installer must give a copy of this manual to the owner.

#### Owner

Keep this manual in a safe place in order to provide your serviceman with necessary information.



#### Roberts-Gordon Europe Limited

Unit A, Kings Hill Business Park

Darlaston Road, Wednesbury

West Midlands WS10 7SH UK

Telephone: +44(0)121 506 7700

Fax: +44 (0)121 506 7701

Service Telephone: +44 (0)121 506 7709

Service Fax: +44 (0)121 506 7702

E-mail: [uksales@rg-inc.com](mailto:uksales@rg-inc.com)

E-mail: [export@rg-inc.com](mailto:export@rg-inc.com)

[www.rg-inc.com](http://www.rg-inc.com)

[www.combat.co.uk](http://www.combat.co.uk)



Authorised User No. 00184



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COMBAT® Compact Tubular Unit Heaters are high efficiency heaters and are listed on the Enhanced Capital Allowance Scheme 'Energy Technology Product List'. The ETL symbol is a UK registered certification mark of The Carbon Trust.

## Product Approval

ROBERTS GORDON® appliances have been tested and CE certified as complying with the essential requirements of the Gas Appliance Directive, the Low Voltage Directive, the Electromagnetic Compatibility Directive and the Machinery Directive for use on natural gas and LPG when installed, commissioned and maintained in accordance with these instructions.

These instructions refer to appliances designed to operate in the European Union.

Appliances designed for other countries (Non-European Union) are available on request.

This appliance must be installed in accordance with the local and national codes in force and used only in a sufficiently ventilated space, as specified in these instructions.

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

**SECTION 1: HEATER SAFETY**



Your Safety is Important to Us!  
 This symbol is used throughout the manual to notify you of possible fire, electrical or burn hazards. Please pay special attention when reading and following the warnings in these sections.

Installation, service and annual inspection of heater must be done by a registered installer/contractor qualified in the installation and service of gas-fired heating equipment.

Read this manual carefully before installation, operation, or service of this equipment.

This heater is designed for heating non-residential indoor spaces. Do not install in residential spaces. These instructions, the layout drawing, local codes and ordinances, and applicable standards that apply to gas piping, electrical wiring, venting, etc. must be thoroughly understood before proceeding with the installation.

Protective gear is to be worn during installation, operation and service. Thin sheet metal parts have sharp edges. To prevent injury, the use of work gloves is recommended. The use of gloves will also prevent the transfer of body oils from the hands.

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

The heater must be applied and operated under the general concepts of reasonable use.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do no play with the appliance.

For additional copies of the Installation, Operation and Service Manual, please contact Roberts-Gordon Europe Limited.

**1.1 Manpower Requirements**

To prevent personal injury and damage to the heater, two persons will be required for installation

**1.2 Safety Labels and Their Placement**

Product safety signs or labels should be replaced by the product user when they are no longer legible. Contact Roberts-Gordon for obtaining replacement signs or labels. See Page 2, Figure 1 through Page 3, Figure 2.

**Figure 1: Front and Back Panel Label Placement**

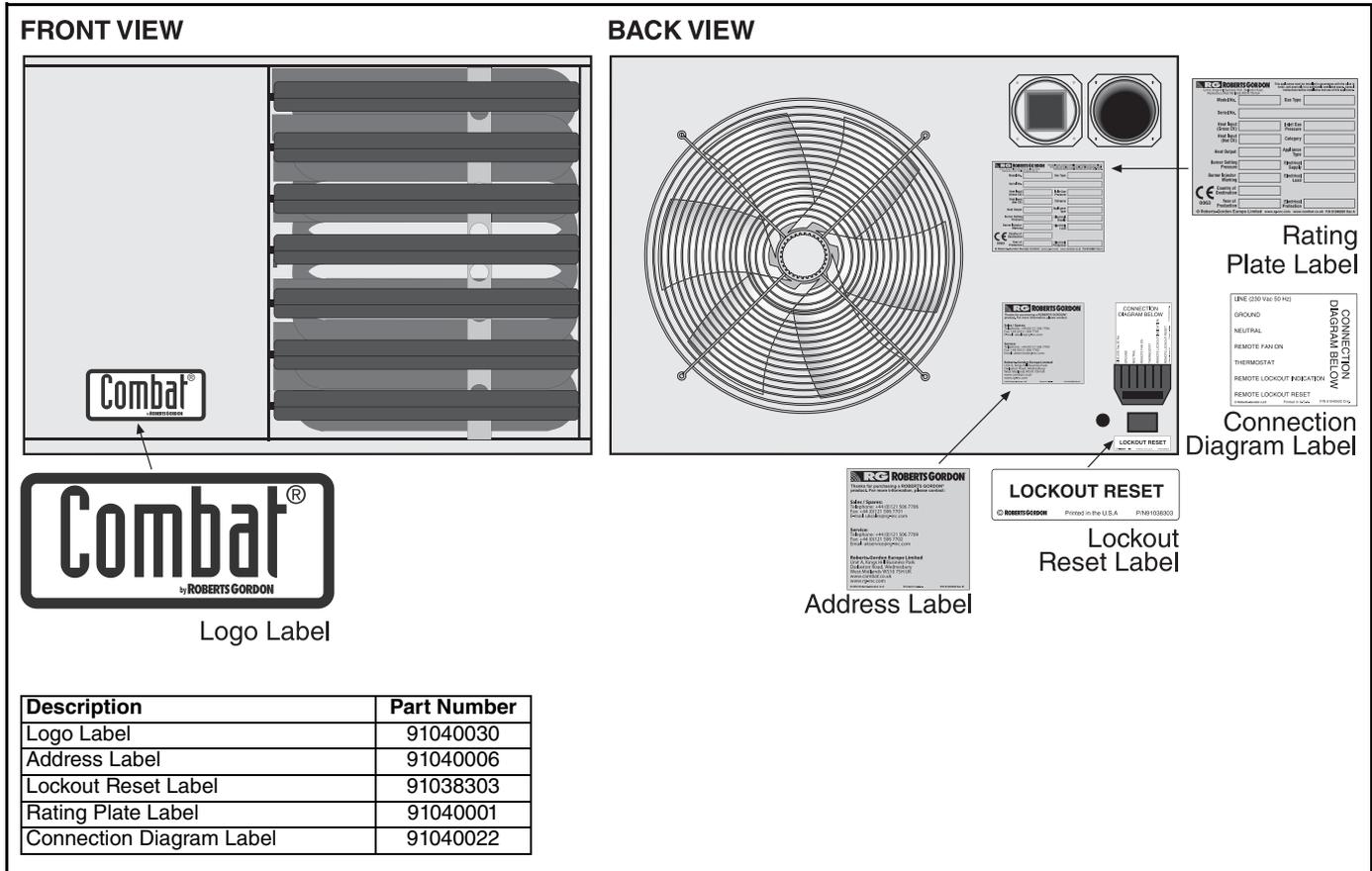
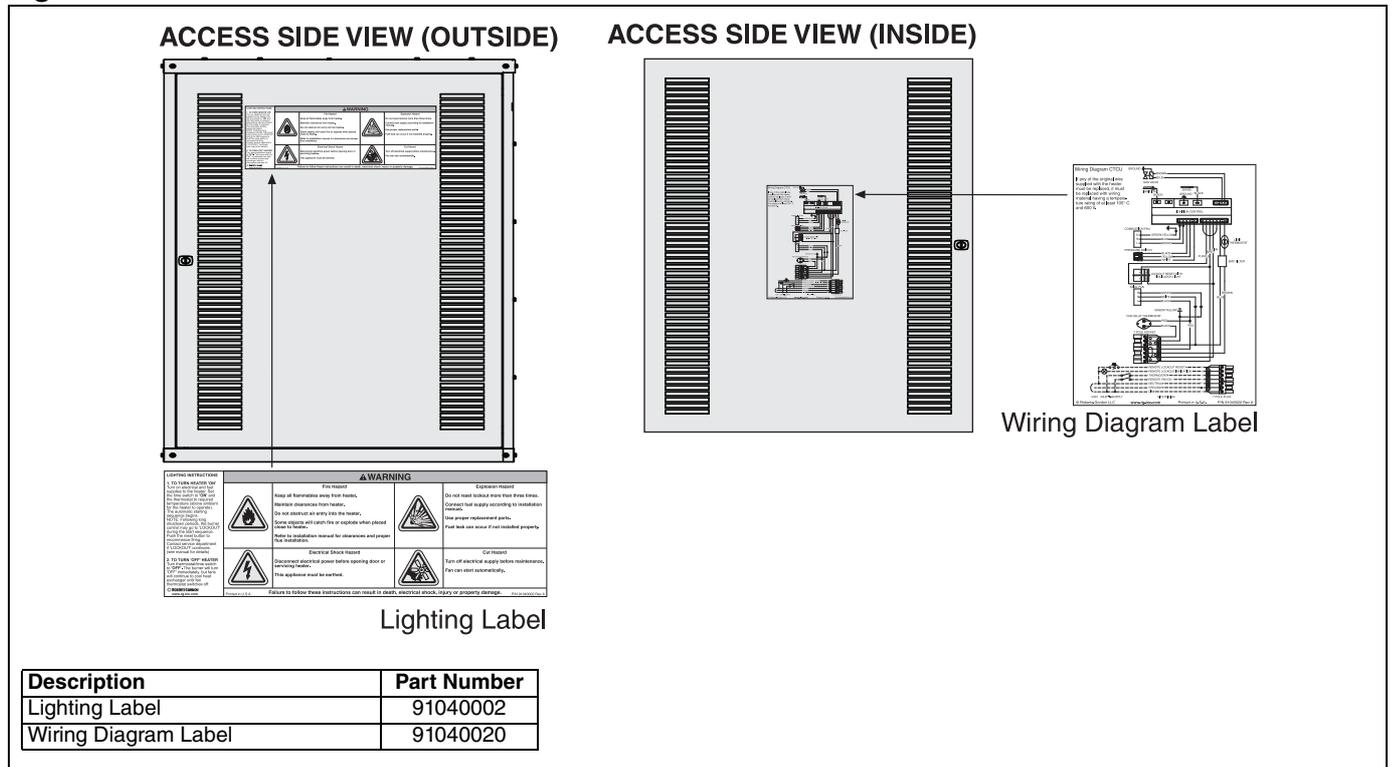


Figure 2: Side Panel Label Placement



## SECTION 2: INSTALLER RESPONSIBILITY

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon recommends the installer contact a local building inspector, Fire Officer or insurance company for guidance.
- To use the information given in the manual together with the local and national codes to perform the installation.
- To install the heater in accordance with the clearances to combustibles of this heater.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports, flues and air intakes.
- To provide access to burners for servicing.
- To provide the owner with a copy of this installation, commissioning, operation and service manual.
- To never use heater as support for ladder or other access equipment and never hang or suspend anything from heater.
- To ensure that there is sufficient ventilation in the area to comply with the requirements of all relevant local and national codes.
- To safely and adequately install heater using materials with a minimal working load of 33 kg.
- To ensure the heater is placed in an approved application.

### 2.1 Clearances to Combustibles

A laminated wall tag is available for the heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Affix the tag by peeling off the backing of the adhesive strips on the rear surface and position the tag on a wall near the heater (e.g. thermostat or ROBERTS GORDON® Controller).

A copy of the wall tag (P/N 91040029) is illustrated on the back cover. Know your model number and installed configuration. Model number and installed configuration are found on the burner and in the Installation, Operation and Service Manual. Write the largest clearance dimensions with permanent ink according to your model number and configuration in the open spaces on the tag.

## 2.2 Corrosive Chemicals

 <b>CAUTION</b>

<p><b>Product Damage Hazard</b></p> <p><b>Do not use heater in area containing corrosive chemicals.</b></p> <p><b>Refer to appropriate Material Safety Data Sheets (MSDS).</b></p> <p><b>Failure to follow these instructions can result in product damage.</b></p>

Roberts-Gordon cannot be responsible for ensuring that all appropriate safety measures are undertaken prior to installation; this is entirely the responsibility of the installer. It is essential that the contractor, the sub-contractor, or the owner identifies the presence of combustible materials, corrosive chemicals or halogenated hydrocarbons\* anywhere in the premises.

\* **Halogenated Hydrocarbons** are a family of chemical compounds characterized by the presence of halogen elements (fluorine, chlorine, bromine, etc.). These compounds are frequently used in refrigerants, cleaning agents, solvents, etc. If these compounds enter the air supply of the burner, the lifespan of the heater components will be greatly reduced. Warranty will be invalid if the heater is exposed to halogenated hydrocarbons.

### 2.3 National Standards and Applicable Codes

All appliances must be installed in accordance with the latest revision of applicable standards and local and national codes. This refers also to the electric, gas and venting installation. Note: Additional standards for installations in public garages, aircraft hangars, etc. may be applicable.

## SECTION 3: CLEARANCES TO COMBUSTIBLES

<b>⚠ WARNING</b>

<b>Fire Hazard</b>
<b>Keep all flammable objects, liquids and vapours the minimum required clearances to combustibles away from heater.</b>
<b>Some objects will catch fire or explode when placed close to heater.</b>
<b>Failure to follow these instructions can result in death, injury or property damage.</b>

**3.1 Required Clearances to Combustibles**

Clearances are the required distances that combustible objects must be away from the heater to prevent fire hazards. Caution should be used when running the system near combustibles. Combustibles are materials, which may catch on fire and include common items such as wood, paper, rubber, fabric, etc. **Maintain clearances to combustibles at all times for safety.**

Clearances around the heater and flue must be as indicated on *Page 6, Figure 3*, to ensure access for servicing, and correct operation. If clearances to combustibles are not indicated, then installation clearances apply.

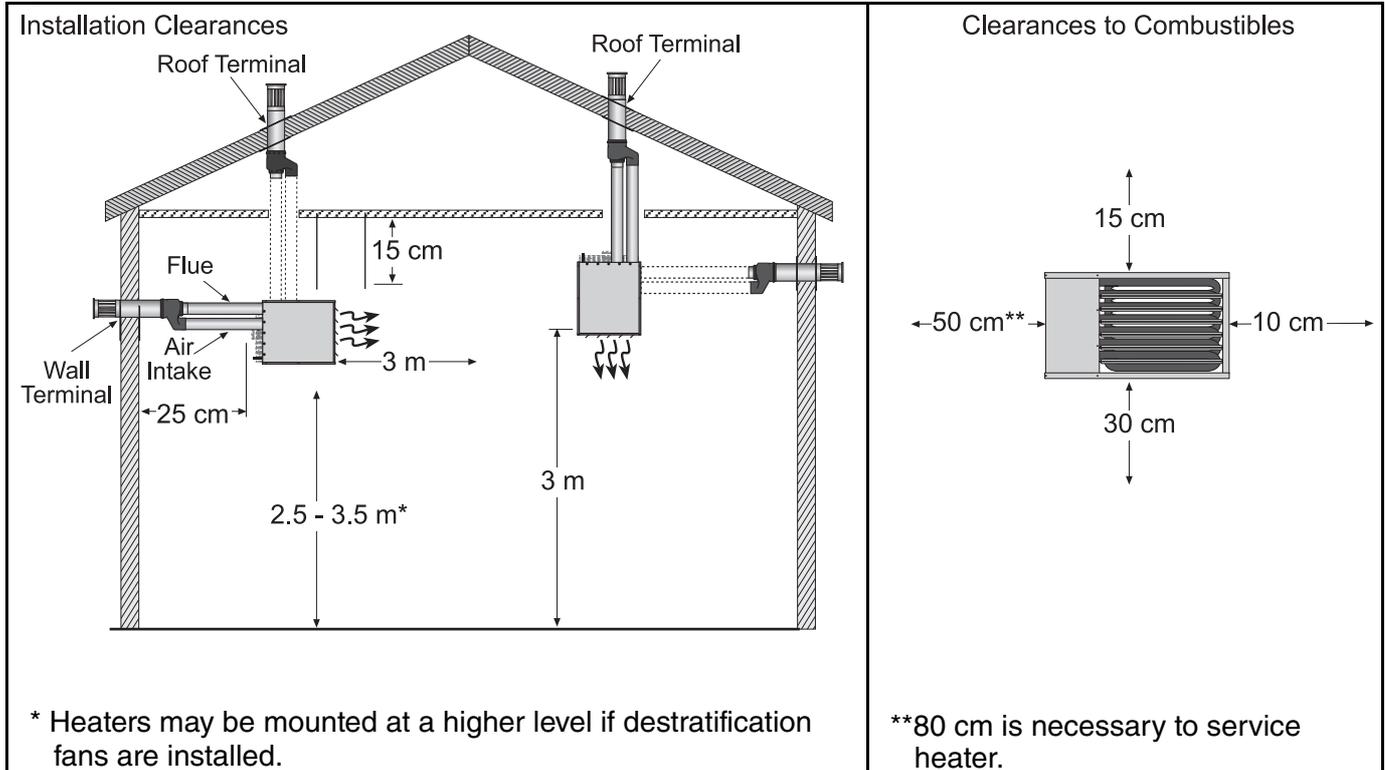
Check the clearances on each burner for the model heater being installed to make sure the product is suitable for your application and the clearances are maintained. Read and follow the safety guidelines below:

- Keep petrol or other combustible materials including flammable objects, liquids, dust or vapours away from this heater or any other appliance.
- The stated clearances to combustibles represents a surface temperature of 32°C (90° F) above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, tri-ply, etc) may be subject to degradation at lower temperatures. It is the installer's responsibility to assure that adjacent materials are protected from degradation.
- Maintain clearances from heat sensitive equipment and workstations.
- Maintain clearances from vehicles parked below the heater.
- Maintain clearances from swinging and overhead doors, overhead cranes, vehicle lifts, parti-

tions, storage racks, hoists, building construction, etc.

- In locations used for the storage of combustible materials, signs must be posted to specify the maximum permissible stacking height to maintain required clearances from the heater to the combustibles. Signs must be posted adjacent to the heater thermostat. In the absence of a thermostat, signs must be posted in a conspicuous location.
- Consult local Building Inspector, Fire Insurance Carrier or other authorities for approval of proposed installation when there is a possibility of exposure to combustible airborne materials or vapours.
- Hang heater in accordance to the minimum suspension requirements on *Page 10, Section 6 and Page 11, Figure 4 through Page 12, Figure 5*.
- Affix the tag on a wall near the heater.

**Figure 3: Installation Clearances and Clearances to Combustibles**



\* Heaters may be mounted at a higher level if destratification fans are installed.

\*\*80 cm is necessary to service heater.

The heater must always be installed at least 1.8 m above the floor.  
The flue pipe must have clearance from combustibles by 5 cm.

If installed at low levels where individuals can come in contact with hot heat exchanger components, adequate guarding must be provided.

All distances are minimum clearance requirements for service access, air flow and safety.

**SECTION 4: CRITICAL CONSIDERATIONS****4.1 Ventilation**

<b>! WARNING</b>

<b>Carbon Monoxide Hazard</b>
<p><b>Heaters may be installed vented or unvented.</b></p> <p><b>Vented heaters must be vented outdoors.</b></p> <p><b>Unvented heaters must be installed in buildings with ventilation rates as per section 7.</b></p> <p><b>Failure to follow these instructions can result in death or injury.</b></p>

It is important to ensure that there is adequate air circulation around the heater to supply air for combustion, ventilation and distribution in accordance with local and national codes.

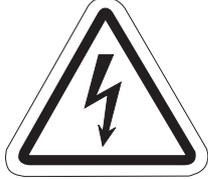
**4.2 Gas Supply**

<b>! WARNING</b>

<b>Fire Hazard</b>
<p><b>Connect gas supply according to Figure 10.</b></p> <p><b>Do not use gas supply pipe and electrical connections to support heater's weight.</b></p> <p><b>Gas can leak if not installed properly.</b></p> <p><b>Failure to follow these instructions can result in death, injury or property damage.</b></p>

It is important that the gas supply pipe is sized correctly to provide the inlet pressure as stated on the heater data plate. The gas supply pipe and electrical connections must not support any of the heater's weight.

**4.3 Electrical Supply**

<b>! DANGER</b>

<b>Electrical Shock Hazard</b>
<p><b>Disconnect electric before service.</b></p> <p><b>Heater must be properly grounded.</b></p> <p><b>Failure to follow these instructions can result in death or electrical shock.</b></p>

A permanent 230 V 50 Hz 1Ø electrical supply is required at the main electrical terminals. The heater also requires suitable energy controls in accordance with *Section 10*.

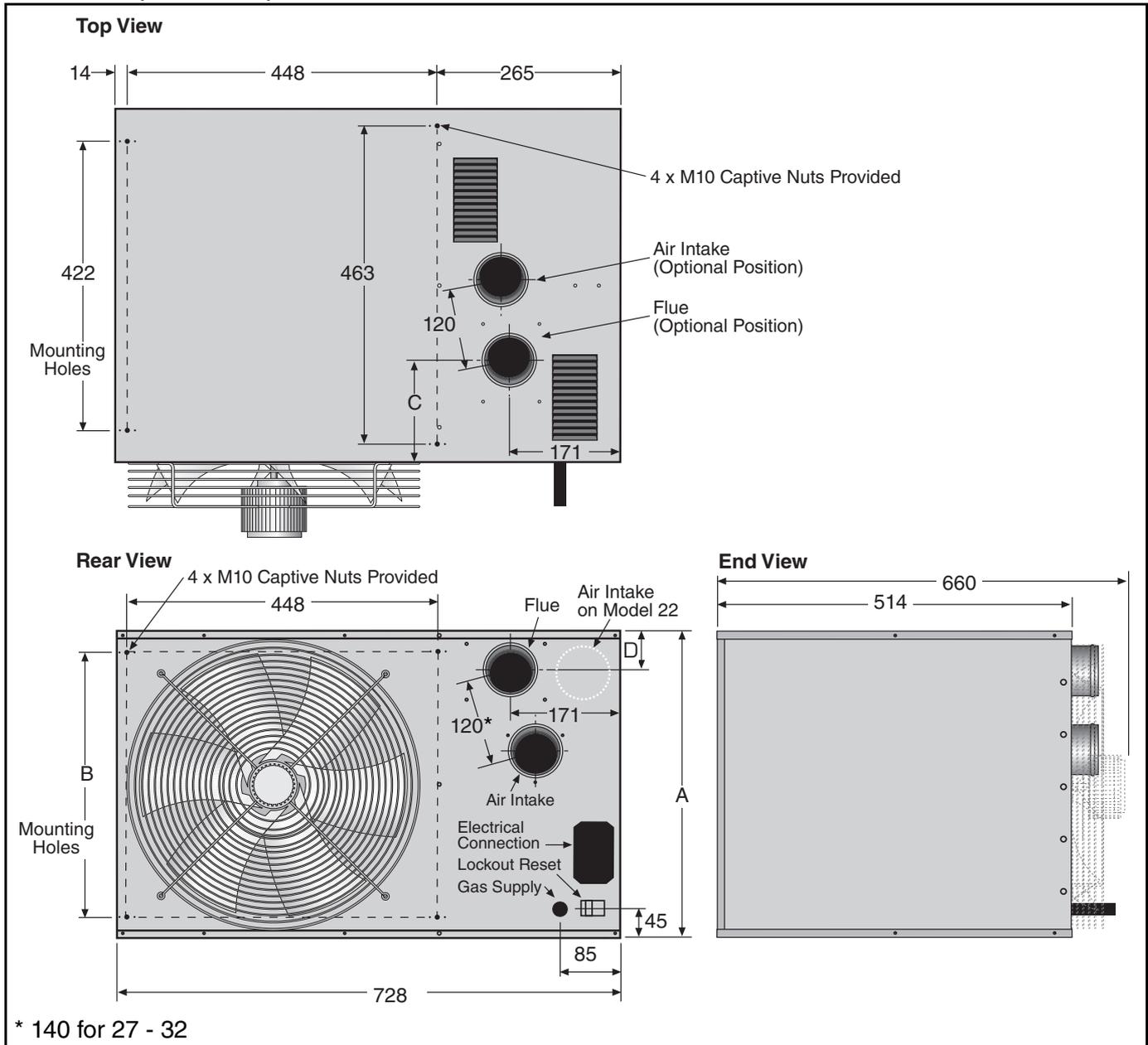
**4.4 Flue**

Choose heater siting to allow for the proper location of the flue. Each heater must be fitted with an individual and correctly sized sealed flue system (*See Page 13, Section 7*).

No other appliance may be connected to the flue. For room sealed installation, the air intake must be the same size sealed system and the flue/air intake must terminate at an approved concentric wall or roof terminal.

**SECTION 5: SPECIFICATIONS**

**5.1 CTCUA (All Models)**



**Dimension Data - CTCUA (All Models)**

		Model	CTCU-7	CTCU-11	CTCU-15	CTCU-22	CTCU-27 / 32
A	Height	mm (in)	304 (12.0)	304 (12.0)	450 (17.7)	450 (17.7)	578 (22.8)
B	Mounting Hole Spacing	mm (in)	239 (9.4)	239 (9.4)	385 (15.2)	385 (15.2)	513 (20.2)
C	Centre of Flue (Top Option)	mm (in)	151 (5.9)	151 (5.9)	151 (5.9)	172 (6.8)	149 (5.9)
D	Centre of Flue	mm (in)	68 (2.7)	68 (2.7)	68 (2.7)	46 (1.8)	59 (2.3)
	Weight	kg	28	30.5	38.5	41	52.3

## 5.2 General Technical Data Table (All Models)

	Model	CTCU-7	CTCU-11	CTCU-15	CTCU-22	CTCU-27 / 32
<b>CTCUA, Axial Fans</b>						
Total Electrical Load	W	260	274	336	384	345
Run Current	A	1.1	1.2	1.5	1.7	1.5
Start Current	A	1.7	1.8	2.5	2.9	2.6
Air Flow	m <sup>3</sup> /h	1120	1220	2710	2750	4474
Air Throw	m	9	12	14	16	16
Sound Pressure Level at 3 m	[NR] dB(A)	[31] 37	[35] 41	[39] 45	[42] 48	[42] 48
<b>Flue and Air Intake</b>						
Flue and Air Intake Size	mm Ø	80	80	80	80	100
*Maximum Straight Flue/Air Intake	m	2.5	4	5	5	5

Electrical load at 230 V 50 Hz measured by calculating from total run current of appliance.

\* Do not exceed the maximum length of flue stated or heater may not operate properly.

Reduce the maximum length stated by 1 m for each 90° bend installed.

\*\*If minimum air flow requirements are not met, then temperature limit devices will shut down the heater.

## 5.3 Technical Data Table (All Models)

Appliance Category II <sup>2H/L 3B/P</sup>

	Model	CTCU-7	CTCU-11	CTCU-15	CTCU-22	CTCU-27	CTCU-32
Heat Input Gross CV	kW (Btu/h) x (1000)	8.5 29	13.4 46	18.3 62	27.5 94	33 113	38.5 131
Heat Input Net CV	kW (Btu/h) x (1000)	7.7 26	12.1 41	16.5 56	24.8 85	29.7 101	34.7 118
Approximate Heat Output	kW (Btu/h) x (1000)	7.1 24	11.1 38	15.1 52	23 78	27.2 93	31.7 108
Natural Gas (G20) Data - Inlet Pressure 20 mbar (7.8 in WG) Min. 17 mbar (6.8 in WG) Max. 25 mbar (10 in WG)							
Burner Pressure	mbar	9.5	9.5	9.5	9.5	9.0	9.0
Gas Rate	m <sup>3</sup> /h ft <sup>3</sup> /h	0.8 29	1.3 45	1.7 62	2.6 93	3.1 110	3.6 127
Natural Gas (G25) Data - Inlet Pressure 25 mbar (10 in WG) Min. 20 mbar (7.8 in WG) Max. 30 mbar (12 in WG)							
Burner Pressure	mbar	9.0	9.0	9.5	9.2	9.2	9.3
Gas Rate	m <sup>3</sup> /h ft <sup>3</sup> /h	0.9 33	1.5 52	2.0 72	3 108	3.6 127	4.2 148
LPG / Propane (G31) Data - Inlet Pressure 37 mbar (14.6 WG) Min. 25 mbar (10 in WG) Max. 45 mbar (18 in WG) Alternative where permitted 50 mbar (20 in WG) Min. 42.5 bar (17 in WG) Max. 57.5 mbar (23 in WG)							
Burner Pressure	mbar	25.6	29.4	29.4	28.6	29.9	29.9
Gas Rate	m <sup>3</sup> /h kg/h	0.3 0.59	0.5 0.93	0.7 1.27	1 1.91	1.2 2.3	1.4 2.68
LPG / Butane (G30) Data - Inlet Pressure 29 mbar (11.4 in WG) Min. 20 mbar (7.8 in WG) Max. 35 mbar (13.8 WG)							
Burner Pressure	mbar	19.2	21.9	22.9	21.4	21.4	22.4
Gas Rate	m <sup>3</sup> /h kg/h	0.2 0.6	0.4 0.94	0.5 1.28	0.8 1.93	.9 2.31	1.1 2.7
Gas Connection							
CTCUA		R - 1/2"					

Gas rates corrected to standard conditions 1013.25 mbar 15° C

## SECTION 6: HEATER INSTALLATION

### 6.1 General

Heaters are designed for installation above 2.5 m. These heaters must be installed within the heated space. Duct delivery systems are not permitted with axial fans. When handling or supporting the heater from below, ensure that the weight is taken at the support points.

### 6.2 Basic Information

CTCU heaters have automatic ignition burners for ON/OFF operation only.

### 6.3 Location and Suspension

All models:

- Must be installed indoors.
- Must be installed in a level position, with horizontal or vertical discharge.
- May be mounted on a shelf of non-combustible material. (See Page 6, Figure 3 and Page 11, Figure 4 for support points)
- May be suspended from above (See Page 11, Figure 4 and Page 12, Figure 5) or from wall brackets of sufficient strength to support the heater as listed in the Dimension Data Table on Page 8, Section 5.1. Drop rods must be a minimum of 10 mm diameter mild steel. Four suspension points (M10 nuts) are located on top of the heater.
- Must be installed in a manner which allows the hinged door to be fully opened to provide access to all serviceable components.

### 6.4 Handling

All CTCU heaters are supplied secured to a wooden pallet and shrink wrapped. Use the pallet to support the heater during handling and installation. When handling or supporting the heater from below, ensure that the weight is taken at the support points.

### 6.5 Suspension and Shelf Mounting



For typical suspension See Page 11, Figure 4.

The gas or electrical supply lines must not be used to support the heater.

Do not locate the gas or electrical supply lines directly over the path of the flue products from the heater.

The heater must be installed in a location that is readily accessible for servicing.

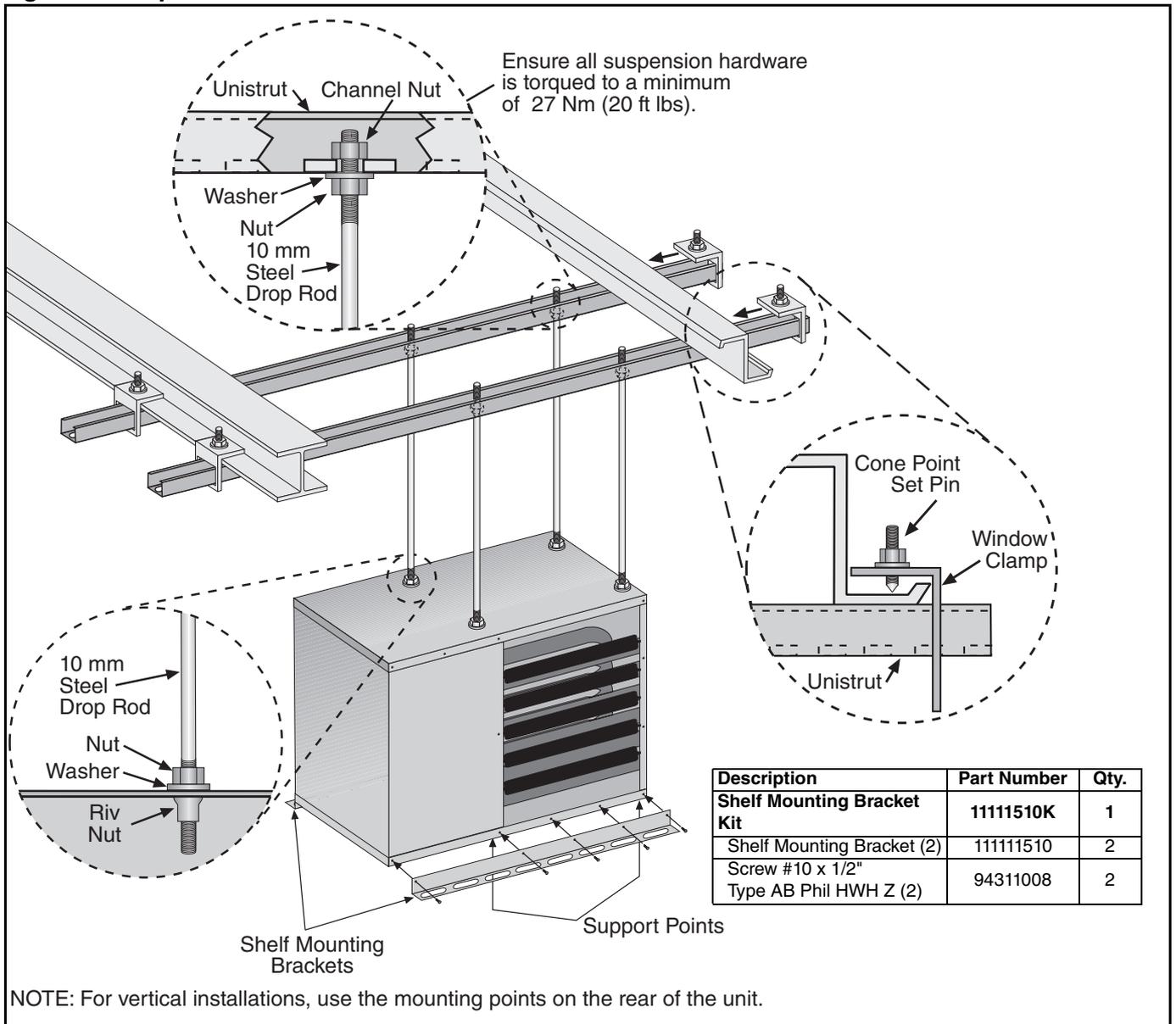
The heater must be installed in accordance with clearances to combustibles as indicated on the wall tag and in this manual.

### 6.6 Wall Mounting

For typical suspension, See Page 11, Figure 4 and Page 12, Figure 5. Wall mounted heaters blowing parallel to the wall can only be installed with the service door away from the wall.

The wall mounting brackets must be attached to a suitable wall using all mounting holes. Screw sizes less than 3/8" may not be used. In order for the wall mounting brackets to adequately carry the weight of the heater, it must be installed according to best building practices.

Figure 4: Suspension Methods



**Figure 5: Shelf Mounting and Hanging Suspension**

Description	Part Number	Qty.
<b>Wall Shelf Mounting Bracket Kit</b>	<b>11111512K</b>	<b>1</b>
Wall Suspension Mounting Bracket Kit	1111510K	1
Shelf Mounting Bracket Kit	11111511K	1

Description	Part Number	Qty.
<b>Wall Suspension Mounting Bracket Kit</b>	<b>11111511K</b>	<b>1</b>
Wall Mounting Bracket Arm Left	111WALL1L	1
Wall Mounting Bracket Arm Right	111WALL1R	1
Wall Mounting Bracket Vertical	111WAL2	2
Wall Mounting Bracket Diagonal	111WAL3	2
M8 x 85 mm Hex Head Bolt	97311405	6
M8 Lock Nut with Nylon Insert	92204504	6
M8 Flat Washer	95204502	6
M8 Lockwasher	96404502	6

Hardware provided to construct mounting bracket assembly only.

**Figure 6: Vertical Louvres (Optional)**

Description	Part Number	Qty.	Description	Part Number	Qty.	Description	Part Number	Qty.
<b>Vertical Louvre Kit CTCU 7 &amp; 11</b>	<b>11111901K</b>	<b>1</b>	<b>Vertical Louvre Kit CTCU 15 and 22</b>	<b>11111900K</b>	<b>1</b>	<b>Vertical Louvre Kit CTCU 27 and 32</b>	<b>11111902K</b>	<b>1</b>
Vertical Louvre Bracket	11111903	2	Vertical Louvre Bracket	11111903	2	Vertical Louvre Bracket	11111903	2
#10 Screw	S103	4	#10 Screw	S103	4	#10 Screw	S103	4
CTCU 7-11 Vertical Louvres	11111901	5	Instruction Sheet	91040021	1	27-32 Vertical Louvre	11111902	5
Louver Spring	90901200	2				Instruction Sheet	91040021	1
Instruction Sheet	91040021	1						

For models 15 and 22, horizontal louvres are re-used.

## SECTION 7: FLUE INSTALLATION

## 7.1 Flue Installation

<b>! WARNING</b>

<b>Carbon Monoxide Hazard</b>
<p><b>Heaters installed unvented must be interlocked with sufficient building exhaust.</b></p> <p><b>Heaters must be installed according to the installation manual.</b></p> <p><b>Failure to follow these instructions can result in death or injury.</b></p>

<b>! WARNING</b>

<b>Fire Hazard</b>
<p><b>Keep all flammable objects, liquids and vapours the minimum required clearances to combustibles away from heater.</b></p> <p><b>Some objects will catch fire or explode when placed close to heater.</b></p> <p><b>Failure to follow these instructions can result in death, injury or property damage.</b></p>

<b>! WARNING</b>

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

## 7.2 Changing Flue and Air Intake Orientation

The heater is sold with horizontal flue and fresh air connections as standard. If vertical flue and fresh air

connections are required, follow the instructions on Page 39, Section 16.4 through Page 40, Section 16.5.

The flue must terminate outside of the building. Flues and air intakes must be a fully sealed system and correctly sized for the model. Flues should be assembled as detailed on Page 14, Figure 7 through Page 15, Figure 9. The joints between the flue terminal and the roof or wall must be properly sealed. If the flue passes through a wall or ceiling of combustible material, it must be enclosed by a sleeve of non-combustible material and be separated from the sleeve by at least a 25 mm air gap.

**Flues and air intakes must be adequately supported so that the heater does not bear the weight of the pipes.**

For flue termination See Page 14, Figure 7 through Page 15, Figure 9.

7.3 Type C<sub>12</sub>, C<sub>32</sub> & C<sub>62</sub> Appliance

Room Sealed.

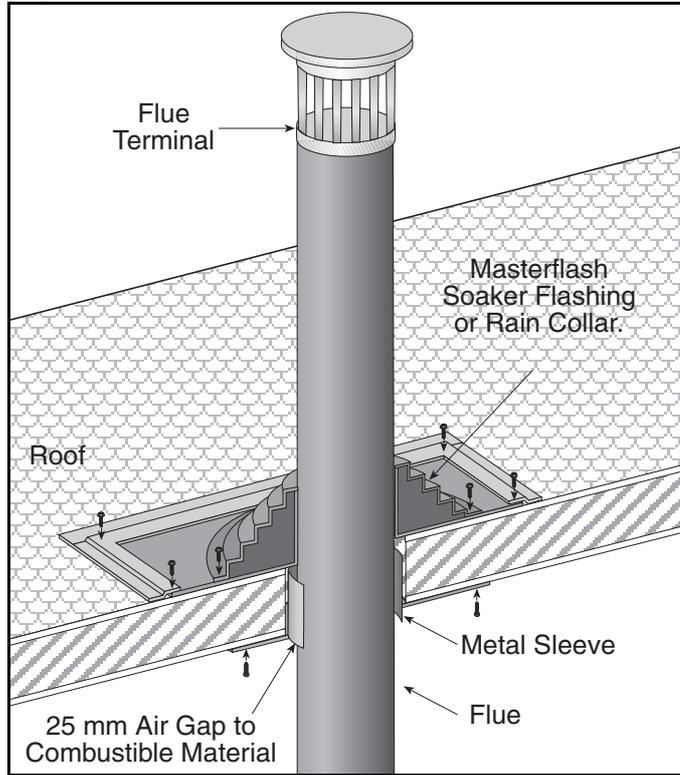
The heaters are designed to be installed as room sealed appliances. The flue and air intake are run as separate pipes to the special concentric wall or roof terminal. See Page 15, Figure 9. The wire mesh inside the fresh air adapter on the heater must be removed prior to installation.

7.4 Type B<sub>22</sub> Appliance

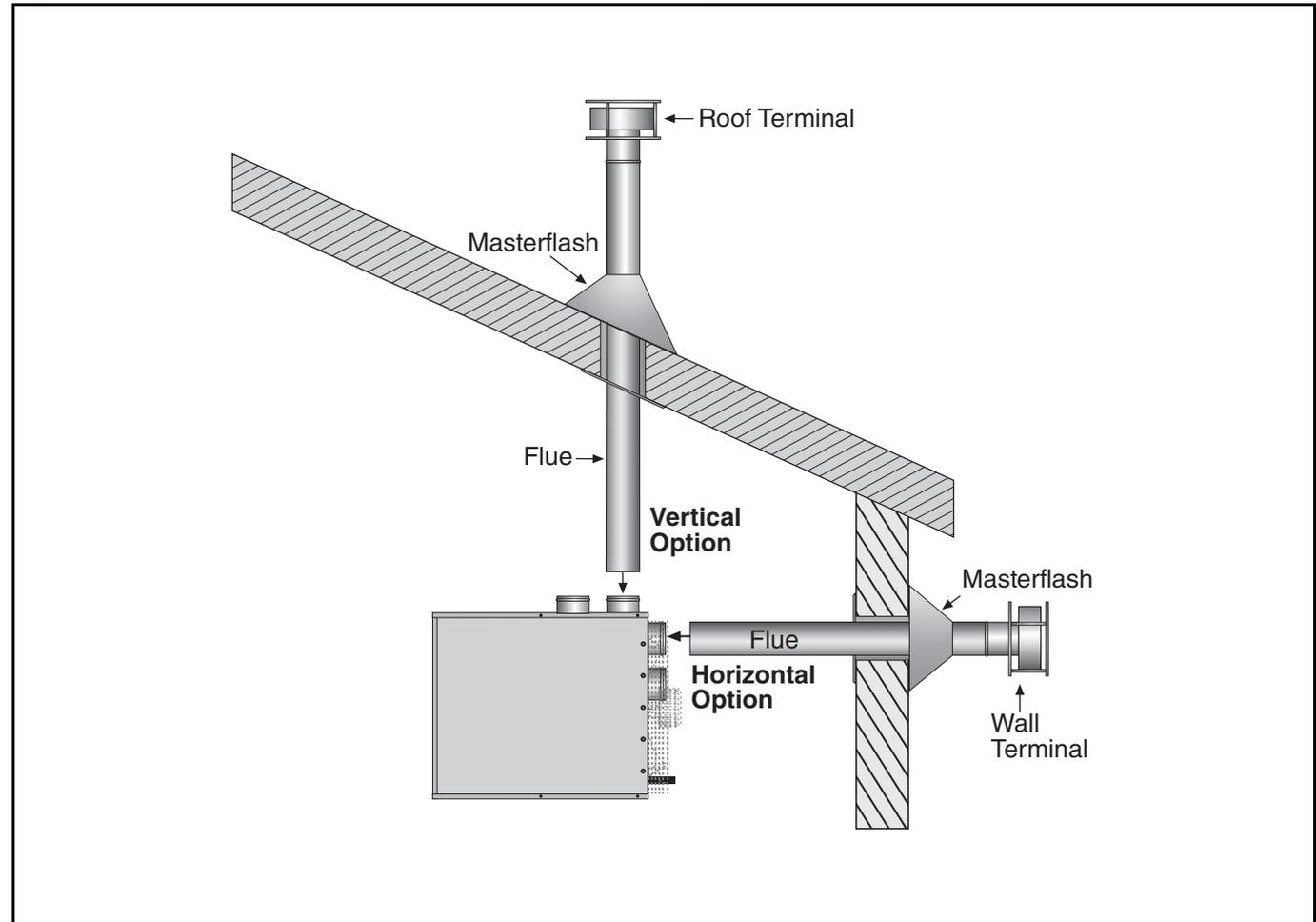
The flue must terminate outside the building and be fitted with a low resistance terminal.

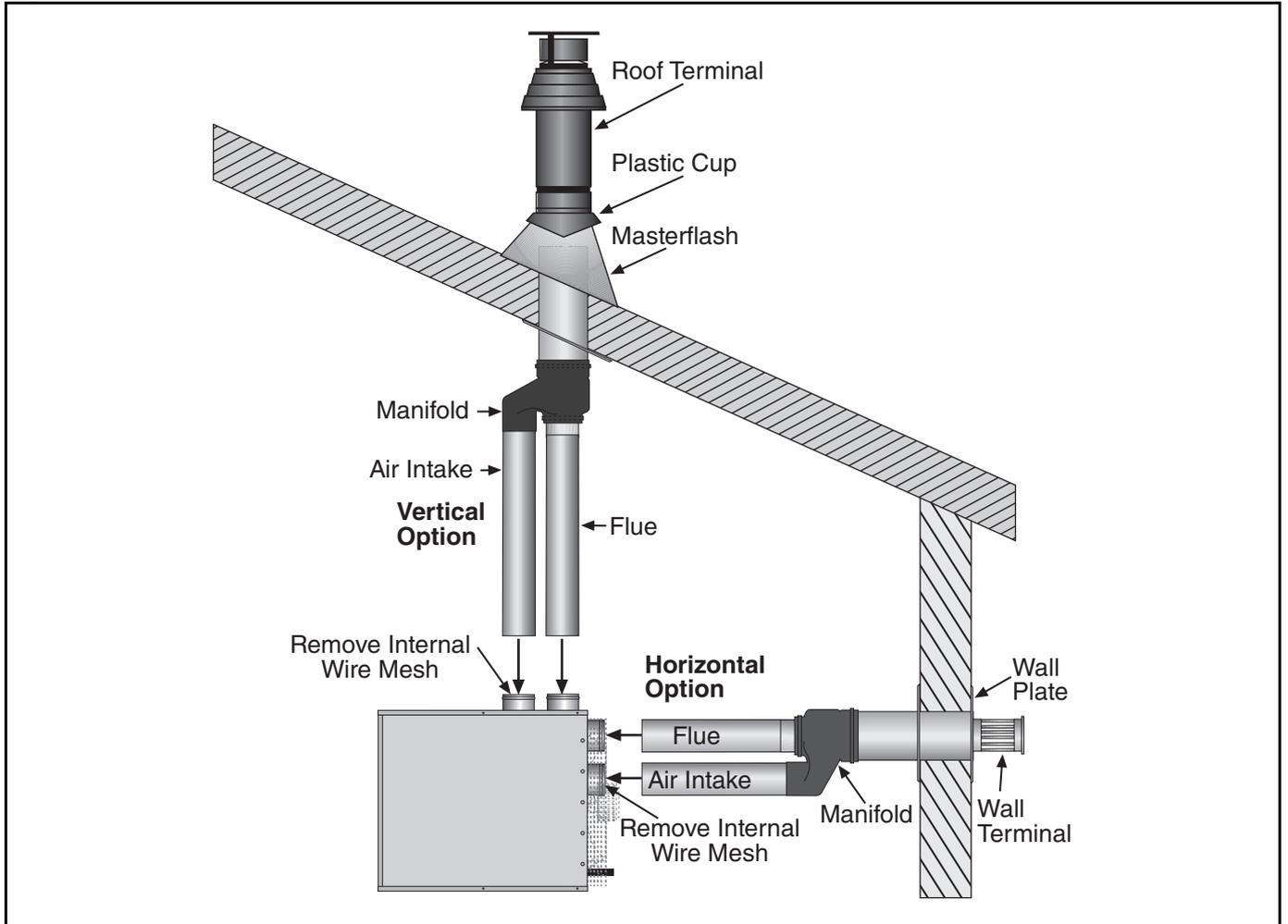
See Page 14, Figure 7 through Page 14, Figure 8.

**Figure 7: Flue and Roof Detail**



**Figure 8: Vertical and Horizontal Flue Termination - Type B<sub>22</sub> Appliance**



**Figure 9: Vertical and Horizontal Flue Termination - Type C<sub>12</sub> C<sub>32</sub> & C<sub>62</sub> Appliances**

## SECTION 8: AIR SUPPLY

### 8.1 Room Sealed Installation

When installed as a room sealed heater, the air for combustion is drawn in from outside the building. It is important to ensure that there is adequate ventilation to provide air for the distribution fan/s.

### 8.2 Open Flued Installation

It is important to ensure that there is adequate air supply at all times for both combustion and heating requirements in accordance with local and national codes. When installed in this mode, the air supply to the heater must also be fitted with a low resistance terminal to prevent the ingress of debris. See *Page 14, Figure 8*.

#### 8.2.1 Heaters Installed Within the Heated Space

Where the volume of the heated space is greater than 4.7 m<sup>3</sup> per kilowatt of total rated heat input and the air change rate is at least 0.5/h, additional high and low level ventilation will not be required.

For a building having an air change rate less than 0.5/h, ventilation will be necessary in accordance with local and national codes. Ventilation direct to outside must be provided as follows:

- Heaters up to 70 kW heat input: 5.0 cm<sup>2</sup> per kW of rated heat input

### 8.3 Building Ventilation

Where ventilation is required, air must be taken from an outside point where it is not likely to be contaminated or obstructed.

Where natural ventilation is used, suitable ventilation with outside air at low level must be provided in accordance with *Section 8.2.1* and local and national codes.

Where mechanical ventilation is used, extract rate must be 5% - 10% less than the inlet rate. The mechanical ventilation must be interlocked with the burner on the heater.

## SECTION 9: GAS PIPE WORK

<b>⚠ WARNING</b>

<b>Fire Hazard</b>
<b>Tighten gas line fittings to connect gas supply according to Figure 10.</b>
<b>Flex gas line can crack when twisted.</b>
<b>Failure to follow these instructions can result in death, injury or property damage.</b>

- The gas supply pipe is adequately sized to carry the total volume of gas for the complete installation.
- An isolating valve and union connection should be used and fitted into the supply adjacent to the heater.
- For suspended heaters, use an approved metal flexible connection between the isolating valve and the heater. **To reduce pressure loss, use one pipe size larger than the heater gas connection.**

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

<b>⚠ WARNING</b>

<b>Explosion Hazard</b>
<b>Leak test all components of gas pipe work before operation.</b>
<b>Gas can leak if pipe work is not installed properly.</b>
<b>Do not high pressure test gas pipe work with heater connected.</b>
<b>Failure to follow these instructions can result in death, injury or property damage.</b>

- **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**

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

A gas meter is connected to the service pipe by the gas supply company. An existing meter should be checked, preferably by the company, to ensure that the meter is adequate for the rate of gas supply required.

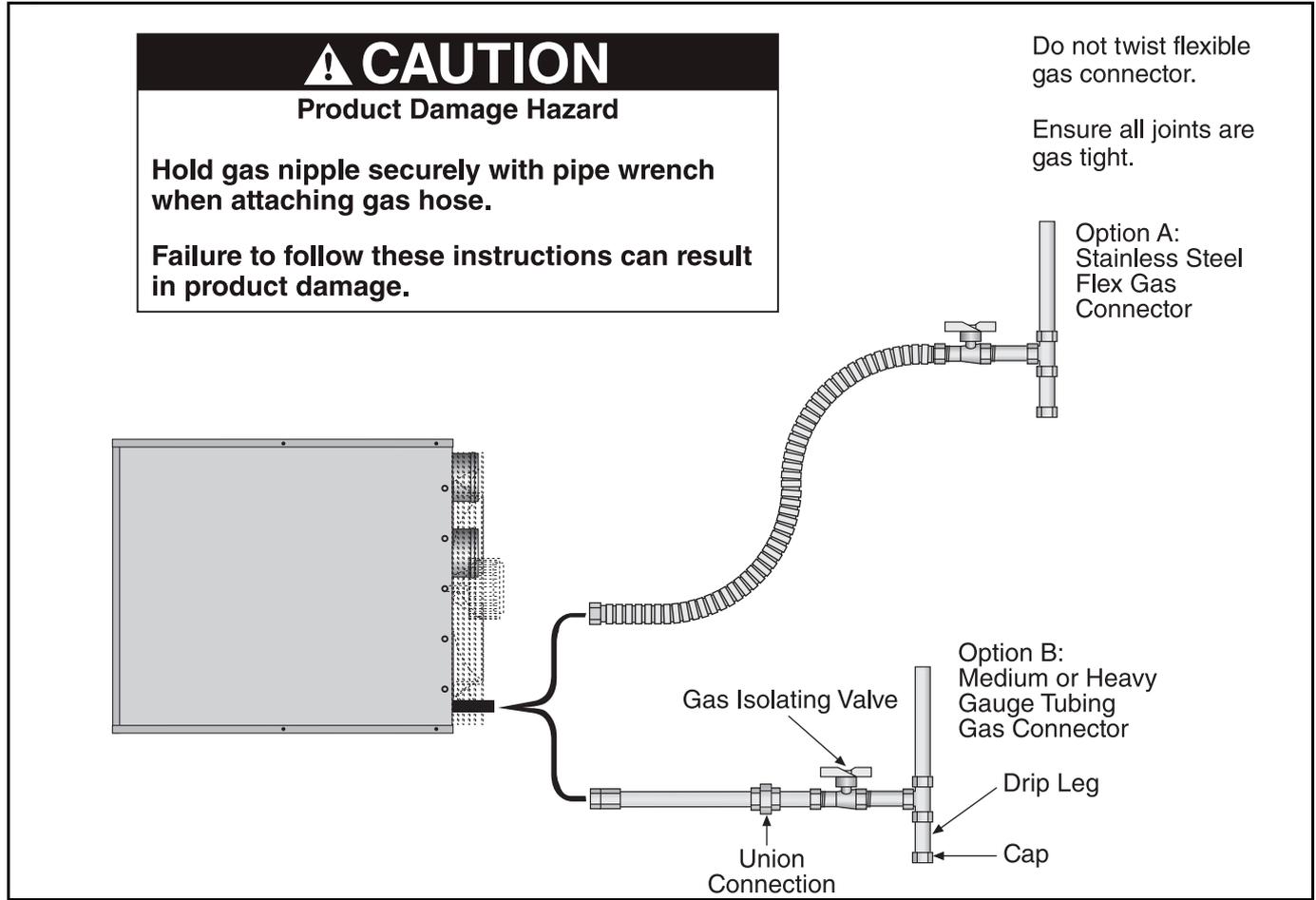
Installation pipes must be fitted in accordance with local and national codes. Pipe work from the meter to the heater(s) must be of adequate size.

### 9.1 Connections

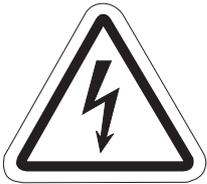
Connect the heater to the gas supply ensuring that the final connections are as follows:

- Gas supply pipe work is run in medium or heavy gauge tubing in compliance with local and national codes.

Figure 10: Gas Connection with Stainless Steel Flex Connector



## SECTION 10: WIRING AND ELECTRICAL INFORMATION

<b>⚠ DANGER</b>

<b>Electrical Shock Hazard</b>
<b>Disconnect electric before service.</b>
<b>Heater must be properly grounded.</b>
<b>Failure to follow these instructions can result in death or electrical shock.</b>

**10.1 Electrical Supply**

All heaters need a constant 230 V 50 Hz single phase supply connected to terminals L, N & Earth. Polarity "L & N" must be correct. The voltage between neutral and earth should be 0 and never exceed 15 volts.

All heaters and controls must be correctly earthed.

All external wiring must comply with the relevant local codes. Wire specification H05VV-F.

External controls must have the same constant 230 V 50 Hz supply.

An isolator with a contact separation of at least 3 mm on all poles must be installed adjacent to, but not attached to, the heater to disconnect all supplies to the heater and any remote control. This switch should be fused to 5 A.

The final connection to the heater should be made by flexible cable or conduit to the 7 pole plug on the inside of the heater using 1 mm<sup>2</sup> cable on all models.

**10.2 Remote Controls**

The heater is designed to be operated by controls installed remote from the heater. *See Page 20, Section 10.3.*

**10.2.1 Burner Controls (Thermostat)**

Controls to operate the burner must be connected between L<sub>1</sub> and T<sub>2</sub>.

**10.2.2 Positioning Room Thermostats or ROBERTS GORDON® Control**

A room thermostat or ROBERTS GORDON® control should be mounted on a wall or column at a height of approximately 1.5 metres from the floor to measure the ambient temperature. It should be clear of both cold draughts and the direct path of warm air from the heater.

**10.2.3 Remote Frost Thermostat**

When required, connect to L<sub>1</sub> and T<sub>2</sub> parallel to the room thermostat.

Locate within the heated space adjacent to the most vulnerable equipment that requires protection.

*See Page 20, Section 10.3.*

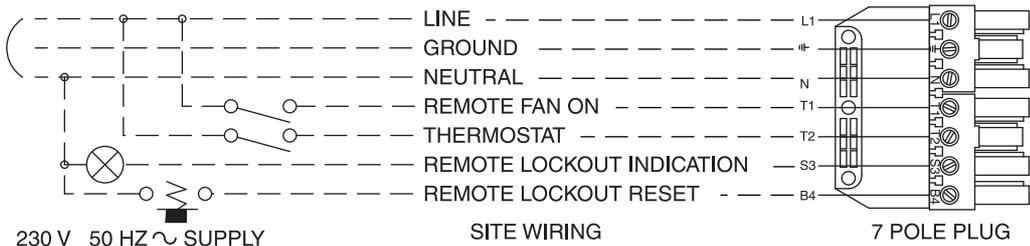
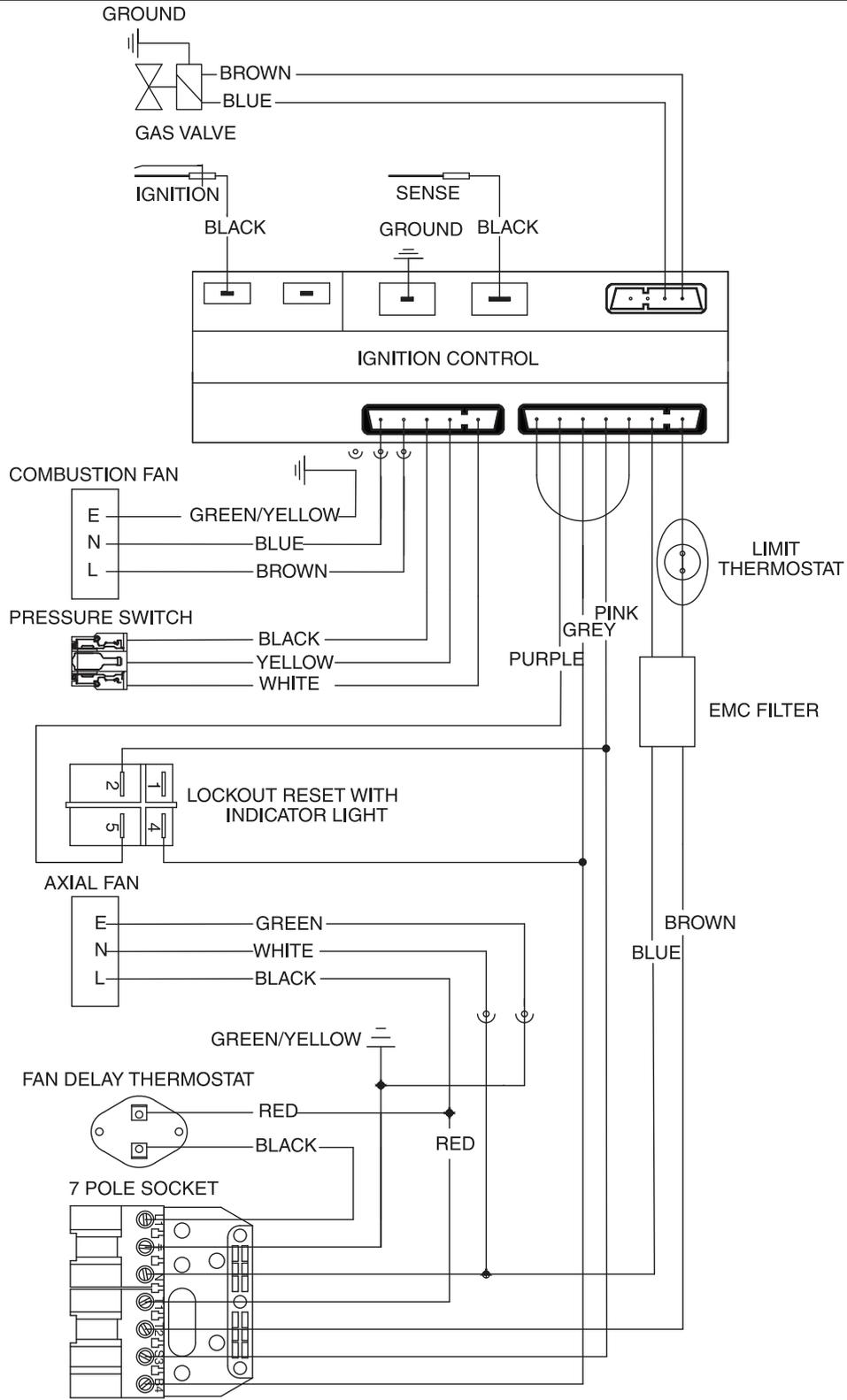
**10.2.4 Remote Fan Controls**

The fan will operate automatically providing there is a constant 230 V supply to the main terminals.

A switch or control wired between terminals Y & T<sub>1</sub> in the terminal block will allow external control of the fan(s).

The fan may be controlled to operate continuously from an external control, with the burner cycling on and off, providing that the fan run-on at close down is not impaired.

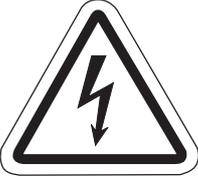
10.3 CTCUA Wiring Diagram (Models 7-32)



**NOTE:**

If any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C and 600 volts.

## SECTION 11: COMMISSIONING

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

**Gas Fired Heater**

Installation Code and Annual Inspections:  
 All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon recommends that a qualified contractor conduct, at a minimum, annual inspections of your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon.

Installation, service, commissioning and annual inspection of the heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment. Read this manual carefully before installation, commissioning, operation, or service of this equipment. All components are accessed via the hinged door. Opening the door exposes live electrical connections and hot components.

**11.1 Pre-Commission Checks**

**All pre-commission checks must be carried out before lighting the heater.**

Ensure that the heater and all controls are suitable for the gas, pressure and electrical supply to which they are to be connected.

**11.1.1 Louvres**

Where fitted, the air delivery louvres need to be set during commissioning to give the required air distribution.

**11.1.2 Electrical Checks**

All pre-commission checks must be carried out before commissioning the heater.

1. Check that all site wiring is connected in accordance with the appropriate wiring diagrams on *Page 20, Section 10.3*.
2. Check the correct fuse size is fitted; See *Page 19, Section 10.1*.

**11.2 Gas Supply**

All aspects of the gas installation including the gas meter must be inspected, tested for soundness and purged in accordance with local and national codes. Ensure that the air is fully purged from the heater inlet pipe up to the main gas valve inlet test nipple.

**11.3 Mechanical Checks**

1. Check that the fan(s) are free to run and delivery louvres are turned to give required air deflection.
2. Check that the flue (and air intake for room sealed) is installed in accordance with these instructions and local regulations.
3. The thermostat limit thermodisc is preset and sealed at the factory and is not adjustable.

### 11.4 Begin Commissioning

#### 11.4.1 Before Operating the Heater

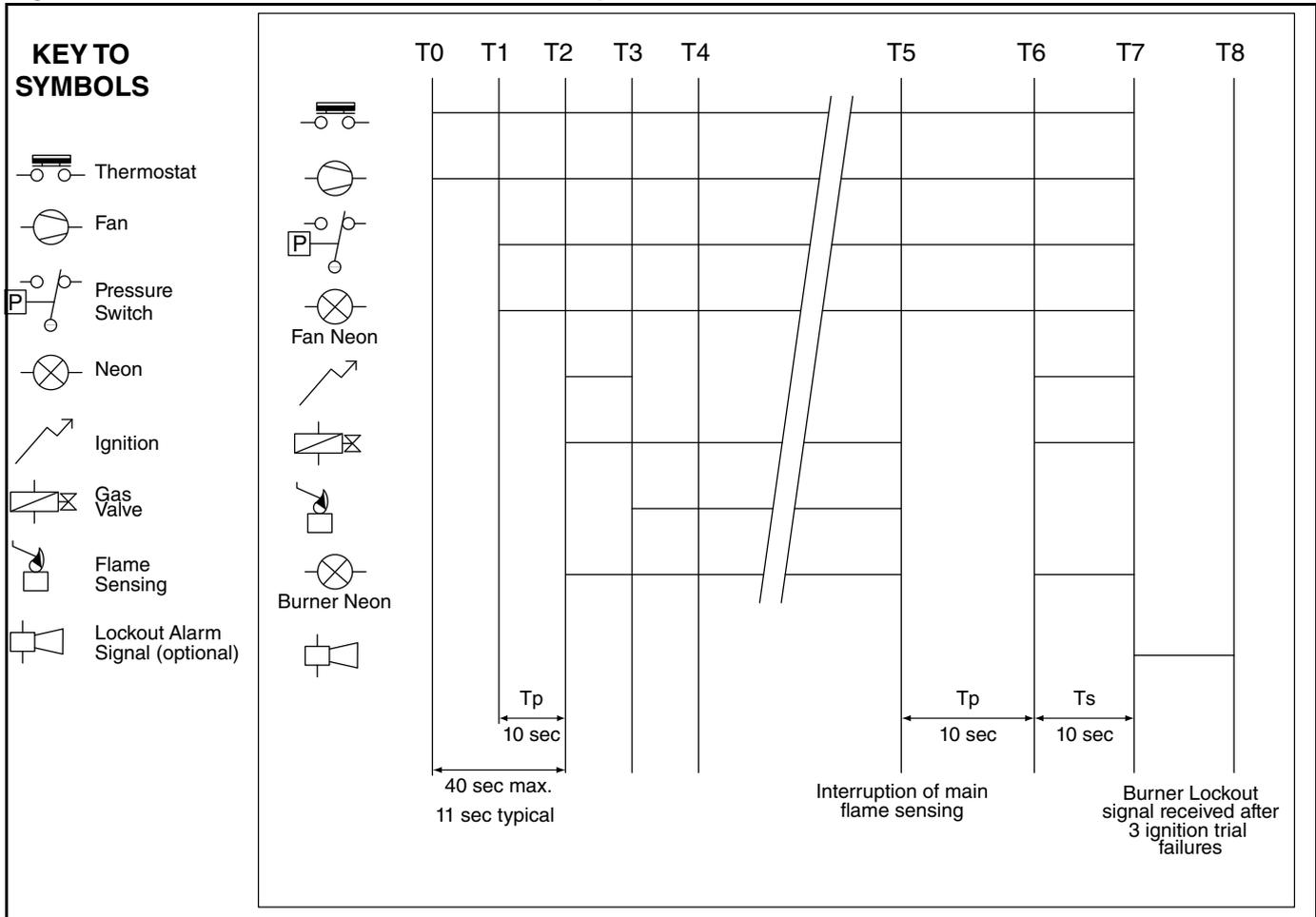
To ensure that all the controls are in safe working order, operate the heater for the first time with the isolating gas valve turned off.

1. Turn off the gas isolating valve

2. Using the installed external control, turn on the burner. The automatic sequence will now begin as described on Page 22, Figure 11.

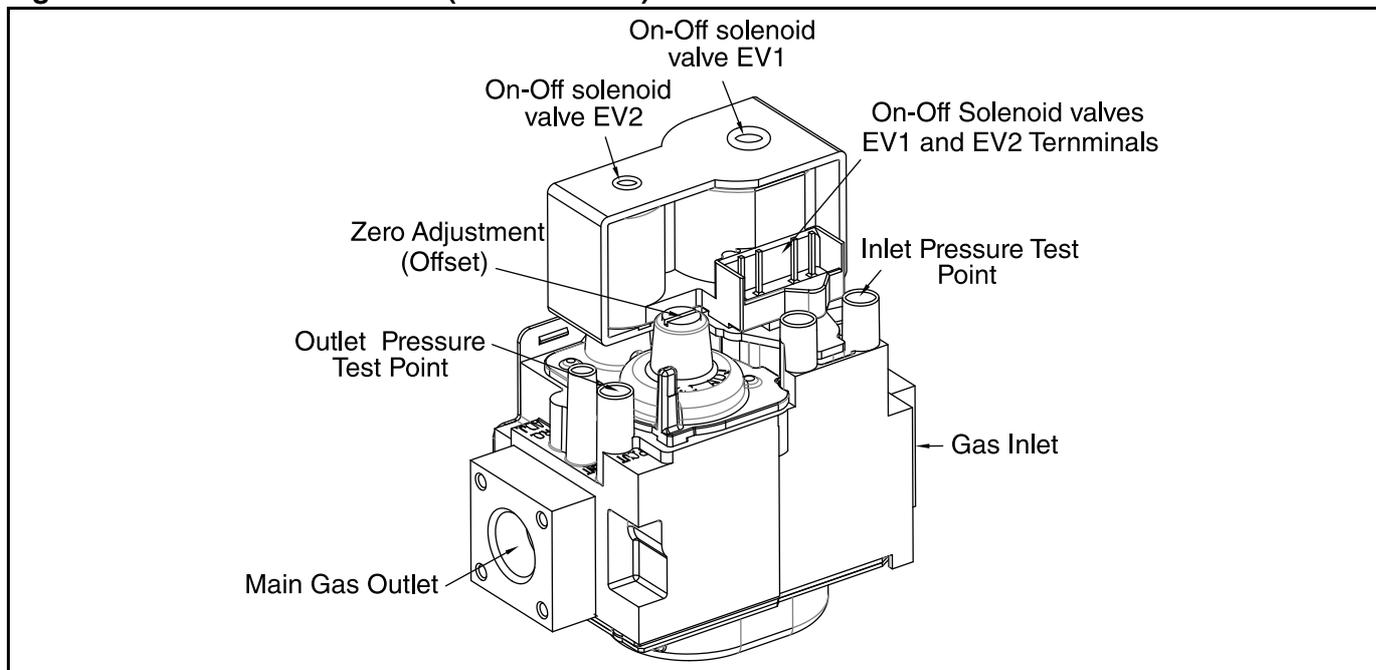
There will be no ignition of the burner and lockout will occur, which proves the controls are operating correctly.

**Figure 11: Automatic Burner Control Box Sequence**



**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.

Figure 12: Gas Valve for Heater (Models 7 - 32)



## 11.4.2 Commissioning the Gas Valves (all gases)

### 11.4.2.1 Check Burner Gas Pressure

1. Loosen the screw cover of the outlet (burner) pressure test point and connect a manometer.
2. With the burner firing, measure the pressure on the manometer. To adjust the burner pressure, remove the regulator cover from the valve and turn the regulator adjustment screw to set the required burner pressure as stated in the Technical Data Tables for the correct gas and model on Page 9, Section 5.3.

**NOTE:** If the correct burner pressure cannot be reached, then check the inlet pressure to the valve, with the burner firing. See Technical Data Tables on Page 9, Section 5.3 for inlet pressure requirement.

**Do not continue to adjust the regulator if the pressure is not changing.**

If the inlet pressure is too low to allow correct burner pressure setting, then the gas inlet pressure must be corrected before completing the commission.

### Check Gas Rate

1. After burner pressure adjustment, allow the heater to operate for at least 15 minutes and then re-check settings.
2. Remove the manometer and refit all covers to the valve and tighten the screw of the outlet pressure tap.
3. Check gas flow rate at gas meter.

### 11.5 Combustion Testing

The only adjustment to alter combustion performance is burner pressure. Combustion quality

must be tested to prove correct heater operation. Incorrect results will indicate faults with the installation or appliance.

Combustion testing must be carried out with all covers in place. The flue gas is sampled in the flue, within 1 meter of the heater. The values of CO<sub>2</sub> should be between 5.7% to 8.0% for natural gas and 6.8% to 9.2% for LPG dependant upon model. The CO will be up to 80 ppm (0.008%) dry, air free dependant upon model. Temperature rise of the flue gases above ambient should be approximately 130° C to 160° C. Seal test hole in flue after testing.

**Pressure Switch:** The pressure switch is factory pre-set for each model and is not adjustable.

### 11.6 Turning Off the Heater

Set the external controls to the off position and the main burner will stop.

The fans will run until they are stopped automatically by the fan thermostat.

**Do not use electrical isolator for control of heater. Electrical isolator will switch off the fan. Heat exchanger could be damaged. Warranty will not cover damage to the heat exchanger if operated improperly.**

### 11.7 External Controls

External controls may include time switch, room thermostat and frost thermostat. Operate each control to ensure that they function correctly. Set the time switch (if fitted) and room thermostat to the users' requirements.

### **11.8 Complete the Commissioning**

Ensure that all covers are fitted correctly and all test points are properly sealed.

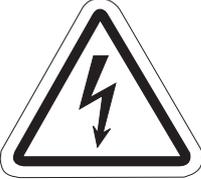
### **11.9 Instruction to the User**

Explain the controls of the heater to the user including how to turn it on and off, using the controls fitted on site.

Give this manual to the user.

Ensure that the user is shown and understands the importance of maintaining clearances to combustibles and the user instructions *on Page 25, Section 12 through Page 26, Section 12.5* and all warnings defined in this manual.

**SECTION 12: USER INSTRUCTIONS**

<b>⚠ DANGER</b>

<b>Electrical Shock Hazard</b>
Disconnect electric before service.
Heater must be properly grounded.
Failure to follow these instructions can result in death or electrical shock.

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

**12.1 User Instructions**

The CTCU heaters are fully automatic and operate from the external controls fitted on site.

The only user controls at the heater are the:

Burner Lockout Reset Button:

See Page 26, Section 12.3.2

Limit Thermostat Reset Button:

See Page 25, Section 12.3.1

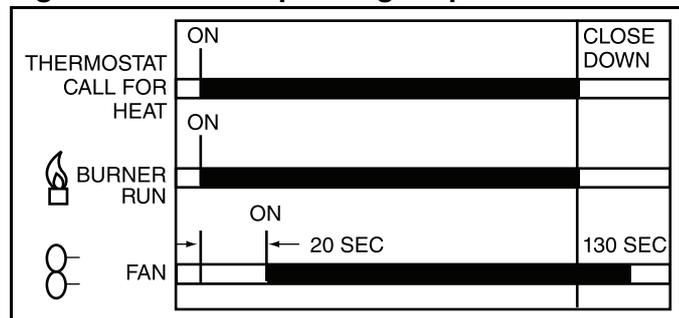
**12.2 Heater Operation**

When the heater has been switched on by the remote controls installed on site, the main burner will automatically turn on.

The burner control box will control the safe ignition of the flame.

All heaters require a constant gas and electricity supply which must not be interrupted during the normal operation of this heater.

**Figure 13: Heater Operating Sequence**



**12.3 Common User Controls**

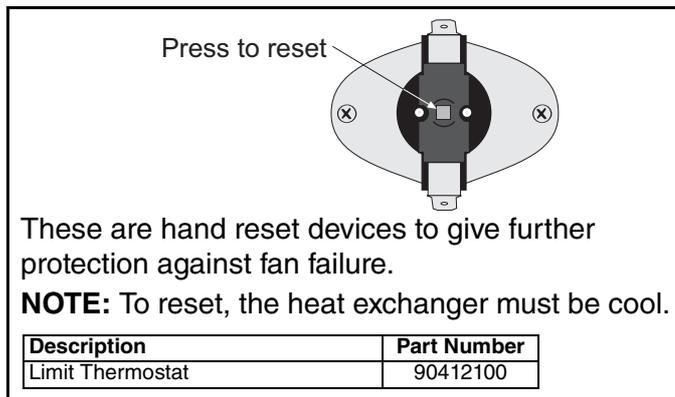
**12.3.1 Fan Thermostat**

The fan thermostat is located inside the access door at the top of the heater. See Page 38, Section 16.3.

This control ensures the heater does not blow cold air in the normal heating cycle.

### 12.3.2 Limit Thermostat

The limit thermostat is located inside the access door of the heater. See Page 38, Section 16.3. This control protects the heat exchanger against overheating.



These are hand reset devices to give further protection against fan failure.

**NOTE:** To reset, the heat exchanger must be cool.

### 12.3.3 Burner Lockout Reset Button

The red warning light at the front of the heater will illuminate when the control has gone to lockout. This may be caused by flame failure. Press the reset button on the back of the heater, (See Page 8, Section 5.1), or the remote reset if installed on site. If control locks out, do not make more than three attempts to restart the heater. Dangerous fuel mixtures can build up. The fault must be traced and repaired by a registered installer or service engineer.

## 12.4 Lighting Instructions

### 12.4.1 To Turn On Heater

1. Ensure that the electrical and gas supplies to the heater are on. Check that the on site controls are “ON”.

**NOTE:** The thermostat setting must be above the ambient temperature for the heater to operate.

2. The automatic firing sequence will begin as described on Page 22, Figure 11. The heater will now operate automatically under the control of the on site controls. Following long shut down periods, the control may go to lockout. See Page 26, Section 12.3.3.

### 12.4.2 To Turn the Heater Off

Set the installed remote controls to the “OFF” position.

The burner will turn off immediately.

The fan will continue to run for a few minutes.

To restart, turn the control used above to “ON”.

## 12.5 Simple Fault Finding

Some possible reasons for the heater not operating are:

1. Gas supply not turned “ON”.
2. Electricity supply not turned “ON”.

3. The time and/or temperature controls are not “ON”.
4. The thermostat limit thermodisc may have operated. This may be caused by an interruption of the electrical supply or failure of the distribution fan.

If the thermostat limit thermodisc persistently operates, there is a fault which must be investigated by a contractor qualified in the installation and service of gas-fired heating equipment.

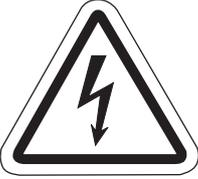
### 12.5.1 Simple Fault Finding (Burner Faults)

If the burner fails to ignite for any reason, it will go to lockout. This will be indicated by the red light on the heater or at the remote indicator (if fitted).

1. Press in and release the lockout reset button. If a remote reset is not fitted, a reset button is on the rear panel of the heater. See Page 8, Section 5.1.

Lockout should not occur during normal operation of the heater and indicates there is a fault condition which must be corrected.

## SECTION 13: SERVICING

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

**13.1 Servicing Instructions**

After commissioning, the heater will require maintenance to be carried out annually. If the heater is used in a dirty or dusty area, more frequent maintenance may be necessary.

Installation, service and annual inspection of heater must be done by a contractor qualified in the installation and service of gas-fired heating equipment.

using the troubleshooting charts on *Page 31, Section 15 through Page 35, Section 15.5.*

**NOTE 2:** Check all gas pipes and pipe joints to ensure there are no cracks or gas leaks. Any cracks in the pipes or pipe joints must be repaired.

**NOTE 3:** Inspect all suspended components and hardware. Insure that they are in good condition, properly tightened, and corrosion free.

<b>⚠ WARNING</b>

<b>Severe Injury Hazard</b> Turn off gas and electrical supply before service.  Fan can start automatically at any time.  Failure to follow these instructions can result in severe injury or product damage.

**NOTE 1:** After any maintenance or repair work always test fire the heater in accordance with the commissioning instructions on *Page 21, Section 11 through Page 24, Section 11.9* to ensure all safety systems are in working order before leaving the heater to operate. Minor faults may be traced by

**13.2 Burner Maintenance**

1. Open the hinged door and remove the burner compartment cover. *See Page 37, Section 16.2.*
2. Clean any deposits from the main burner which may have formed in the injectors or venturi of the burner. *See Page 37, Section 16.2.*
3. Remove the ignition electrode and flame probe. Check condition of ignition electrode and flame probe. Clean off any deposits which may have been formed, check condition of ceramic insulators. Replace as necessary.

**13.3 Fan/Motor Assembly Maintenance**

The main fan bearings are permanently sealed and do not need lubrication. Before cleaning, turn off gas and electrical supply. Remove the fan(s) and use a small brush or duster to clean the fan blades from each side. Replace fan(s) when done.

**13.4 Heat Exchanger Maintenance**

The heat exchanger will remain clean unless a problem has developed with combustion. Inspect the

heat exchanger. Look for signs of overheating at the front tubes which may indicate burner over firing or persistently low air flows.

*through Page 40, Section 16.5).* Ensure that the fan is free to run and that the fan wheel is clean.

**13.5 Gas Control Valve Maintenance**

No regular maintenance is required on these devices. To change gas control valves, *See Page 36, Step 16.1.*

**Do not repair or disassemble on site. Replace faulty gas valves with genuine replacement parts sold and supplied by Roberts-Gordon.**

**13.7 Maintenance Checklist**

**Installation Code and Annual Inspections:** All installations and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service equipment sold and supplied by Roberts-Gordon and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment.

**13.6 Flue Fan**

The flue fan should not require maintenance. However, if the air pressure switch is causing burner lockout, then remove the flue fan from the vent box by unscrewing the screw at the outlet flange and the flue fan mounting plate (*See Page 39, Section 16.4*

To help facilitate optimum performance and safety, Roberts-Gordon recommends that a qualified contractor conduct, at a minimum, annual inspections of your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon.

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**The Vicinity of the Heater** Do not store or use flammable objects, liquids or vapors near the heater. Immediately remove these items if they are present.

Maintain the clearances to combustibles.

Do not hang anything from, or place anything on, the heater.

Immediately remove objects in violation of the clearances to combustibles.

*See Page 5, Section 3.*

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**Vent Pipe/Terminals** Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.

The area must be free of dirt and dust.

Remove any carbon deposits or scale using a wire brush.

If the vent terminal has a screen built in, remove any dirt, dust or deposits from the screen.

*See Page 16, Section 8.*

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**Combustion Air Intake Pipe** Intake pipe and inlet must be intact. Look for obstructions, cracks on the pipe, gaps in the sealed areas or corrosion.

The area must be free of dirt and dust.

Clean and reinstall as required.

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**Heat Exchanger** Make sure there are no cracks.

Make sure there is no sagging, bending or distortion.

Clean or replace as required.

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**Gas Line and Shut-off Valves** Check for gas leaks.

*See Page 17, Section 9.*

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<b>Burner Observation Window</b>	Make sure it is clean and free of cracks or holes. Clean and replace as required.
<b>Flue Blower Scroll, Wheel and Motor</b>	Compressed air or a vacuum cleaner may be used to clean dust and dirt.
<b>Inshot Burners and Orifices</b>	Clear obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.
<b>Direct-Spark Igniter</b>	Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode. The electrode gap should be 1/8" (3.2 mm).
<b>Thermostat</b>	There should be no exposed wire or damage to the device or wiring. <i>See Page 19, Section 10.</i>
<b>Suspension Points</b>	Make sure the heater is hanging securely. Look for signs of wear on the suspension materials or ceiling. <i>See Page 11, Figure 4 and Page 12, Figure 5.</i>
<b>Silicone Tubing</b>	Ensure tight, secure fit on all pressure fittings at pressure switch, burner partition, and blower outlet.
<b>Gas Valve</b>	Verify that cap covering pressure regulator adjustment screw is secure and has not been tampered with. Verify all wiring connections.
<b>Condensate Drain (when installed)</b>	Flush drain and clear any obstructions.
<b>Ductwork</b>	Consult an indoor air quality professional for proper cleaning procedures
<b>Air Circulation Blower</b>	For a complete inspection, refer the manufacturers Installation, Operation and Service manual.
<b>Wall Tag</b>	If wall tag is present, make sure it is legible and accurate. Please contact Roberts-Gordon LLC or your ROBERTS-GORDON® independent distributor if you need a wall tag. <i>See Page 4, Section 2.1.</i>

## SECTION 14: CONVERSION BETWEEN GASES

### 14.1 General

Conversion between gases will require a change of burner injectors and the gas valve re-commissioning to the new conditions.

### 14.2 Burner Conversion

Conversion of the burner assembly from one gas to the other is the same for all types of heaters.

1. Remove the burner compartment cover as shown on *Page 37, Section 16.2*.
2. Remove the connection between the gas valve outlet and the manifold. *See Page 36, Section 16.1* for gas valve removal.
3. Remove the manifold from the burner assembly by removing the screws at the top and bottom. *See Page 37, Section 16.2.1*.
4. Remove the main burner injectors.
5. Replace with the injectors for the new gas ensuring a gas tight seal.
6. Refit all components in reverse order.

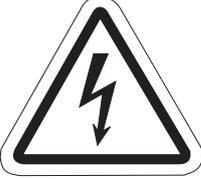
### 14.3 Gas Valves

All gas valves used on the unit have pressure regulators that may be set to operate on natural gas or LPG.

Conversion is carried out by re-setting the burner pressure to the value in the data table during commissioning. *See Page 9, Section 5.3*.

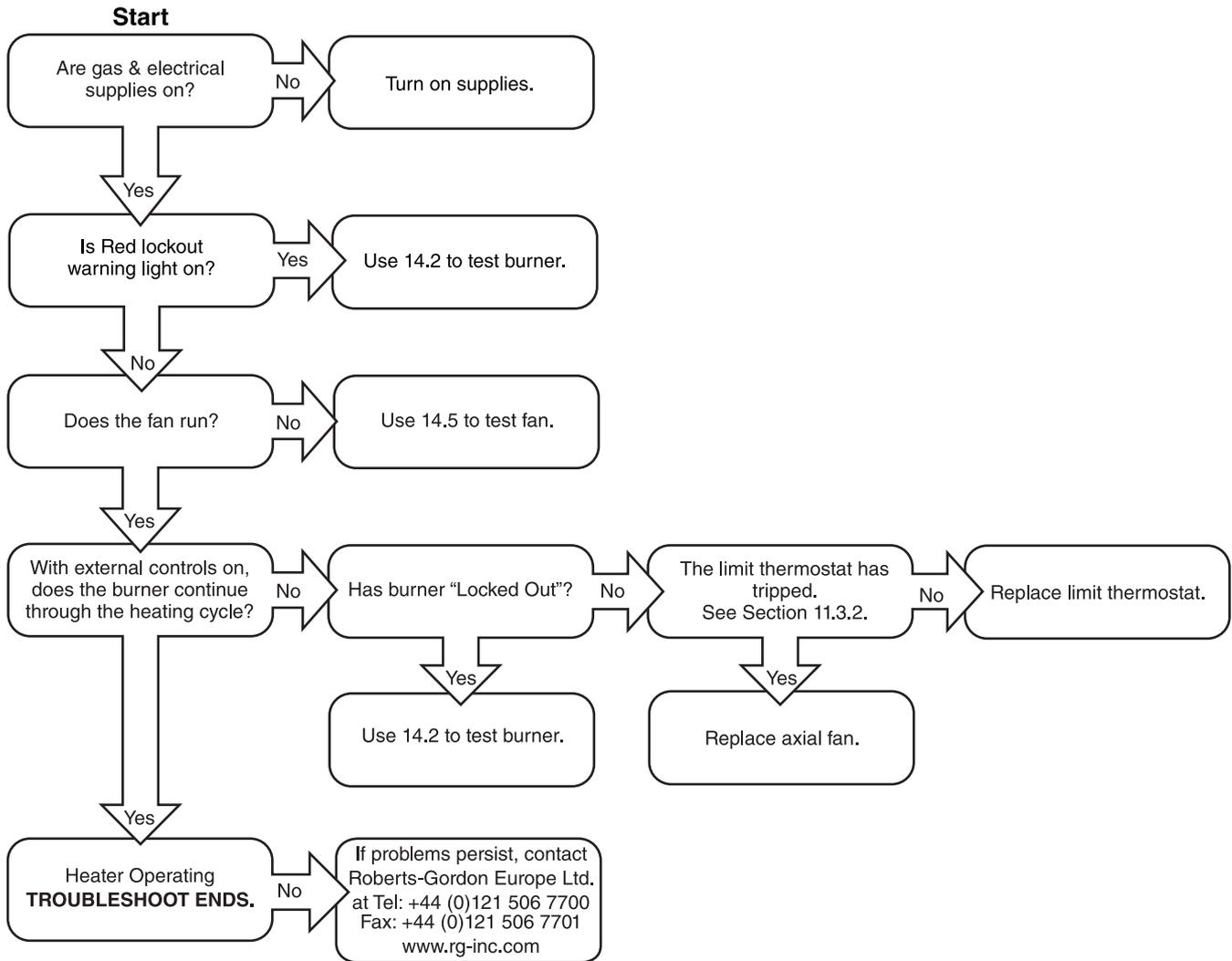
Ensure that the gas inlet pressure to the heater is correct for the new gas, and that the gas supply has been purged of the old gas.

## SECTION 15: TROUBLESHOOTING

<b>⚠ DANGER</b>	
	
<b>Electrical Shock Hazard</b>	
Disconnect electric before service.	
Heater must be properly grounded.	
Failure to follow these instructions can result in death or electrical shock.	

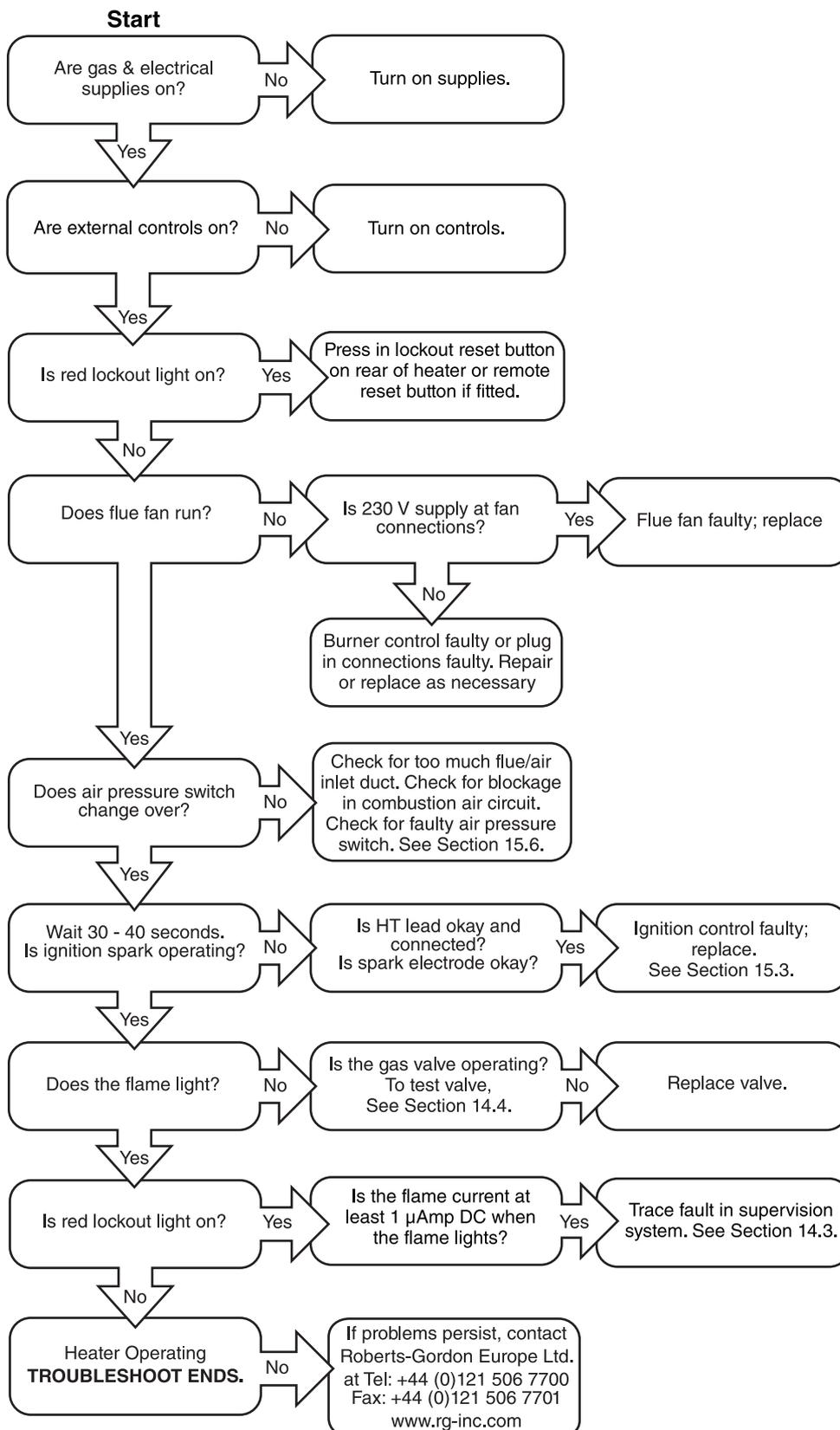
<b>⚠ WARNING</b>			
			
<b>Fire Hazard</b>	<b>Explosion Hazard</b>	<b>Burn Hazard</b>	<b>Cut/Pinch Hazard</b>
Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater.	Turn off gas supply to heater before service.	Allow heater to cool before service.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

15.1 General



For your safety and optimum heater performance, use only ROBERTS GORDON® replacement parts. Conduct Commissioning procedure as shown on Page 21, Section 11.

## 15.2 Troubleshooting For Automatic Ignition Burner Systems

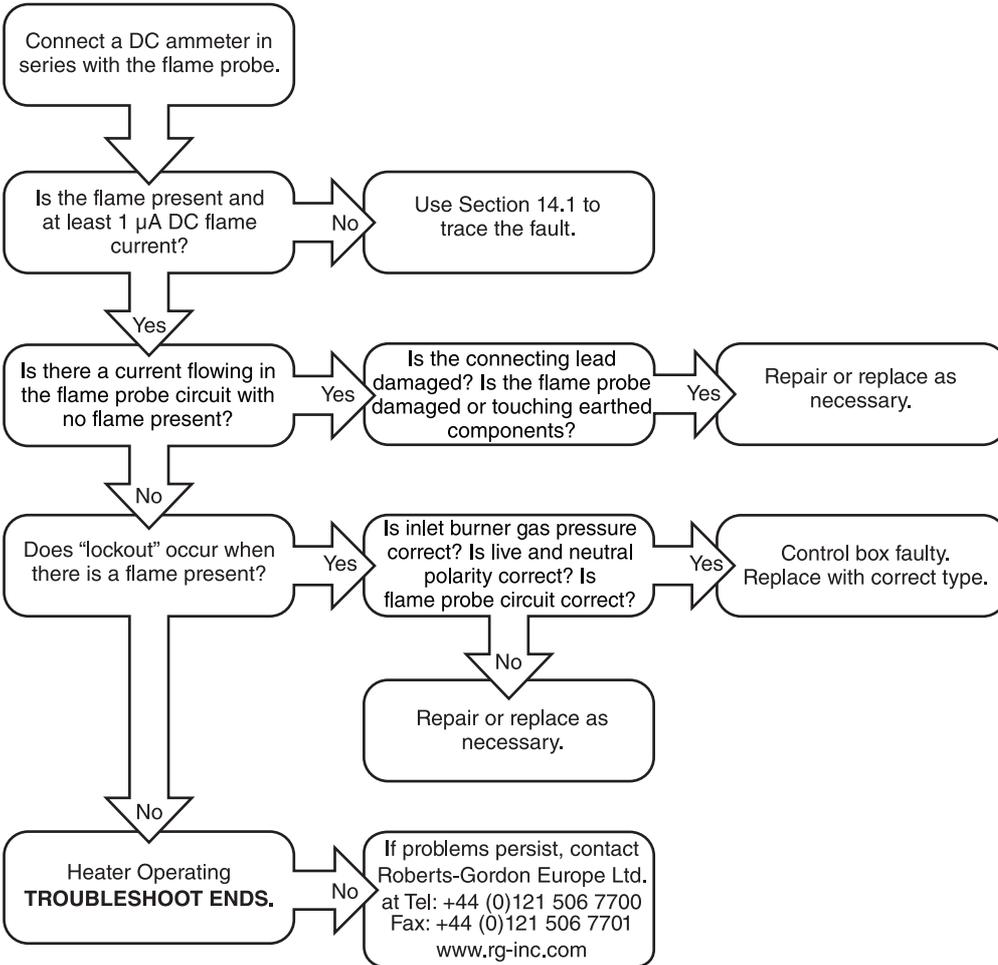


For your safety and optimum heater performance, use only ROBERTS GORDON® replacement parts. **Conduct Commissioning procedure as shown on Page 21, Section 11.**

### 15.3 Troubleshooting for Flame Supervision System

To measure flame current, connect a 0 - 50  $\mu$ A DC meter in series with the flame probe. If the meter reads negative values, then reverse the test leads.

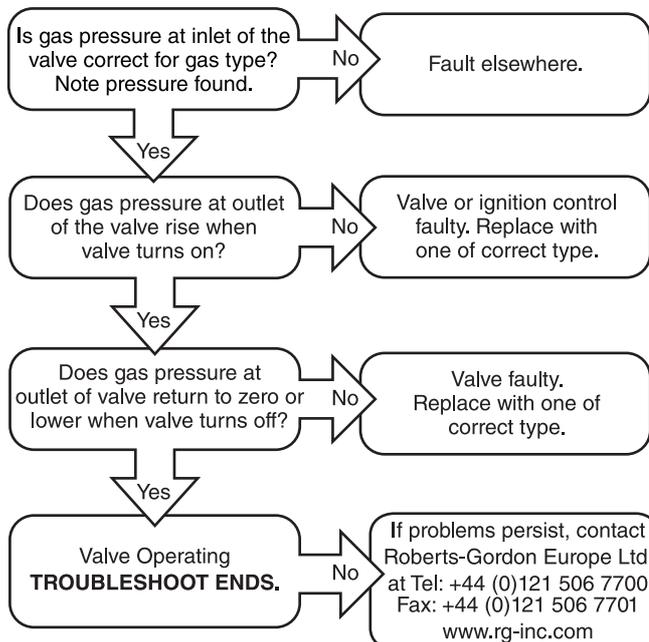
**START**



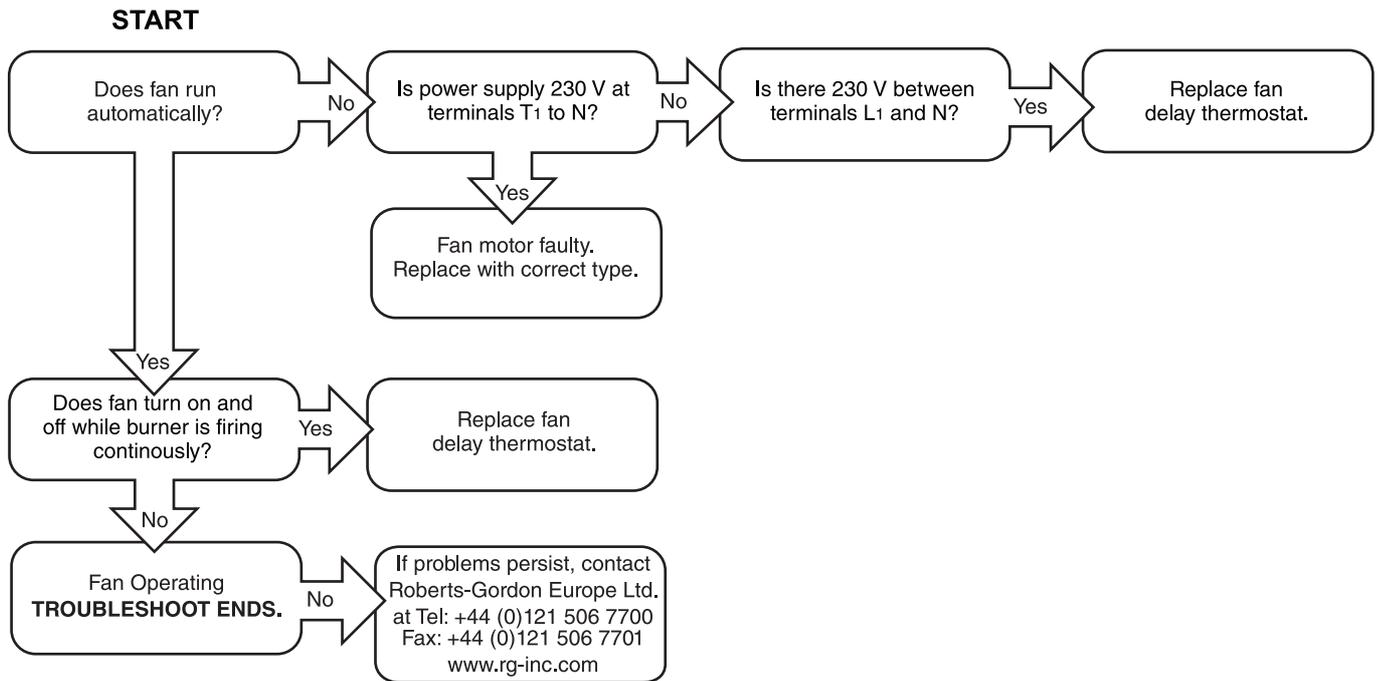
**NOTE:** Minimum flame probe current 1  $\mu$ A DC.

### 15.4 Troubleshooting for Solenoid Valves

**START**



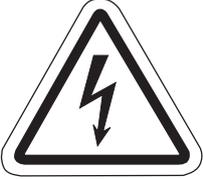
## 15.5 Troubleshooting for Main Fan



For your safety and optimum heater performance, use only genuine ROBERTS GORDON® replacement parts.

**Conduct Commissioning procedure as shown on Page 21, Section 11.**

**SECTION 16: REMOVAL AND REPLACEMENT PARTS**

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

See warnings and notes on Page 27, Section 13 before removing or replacing parts.

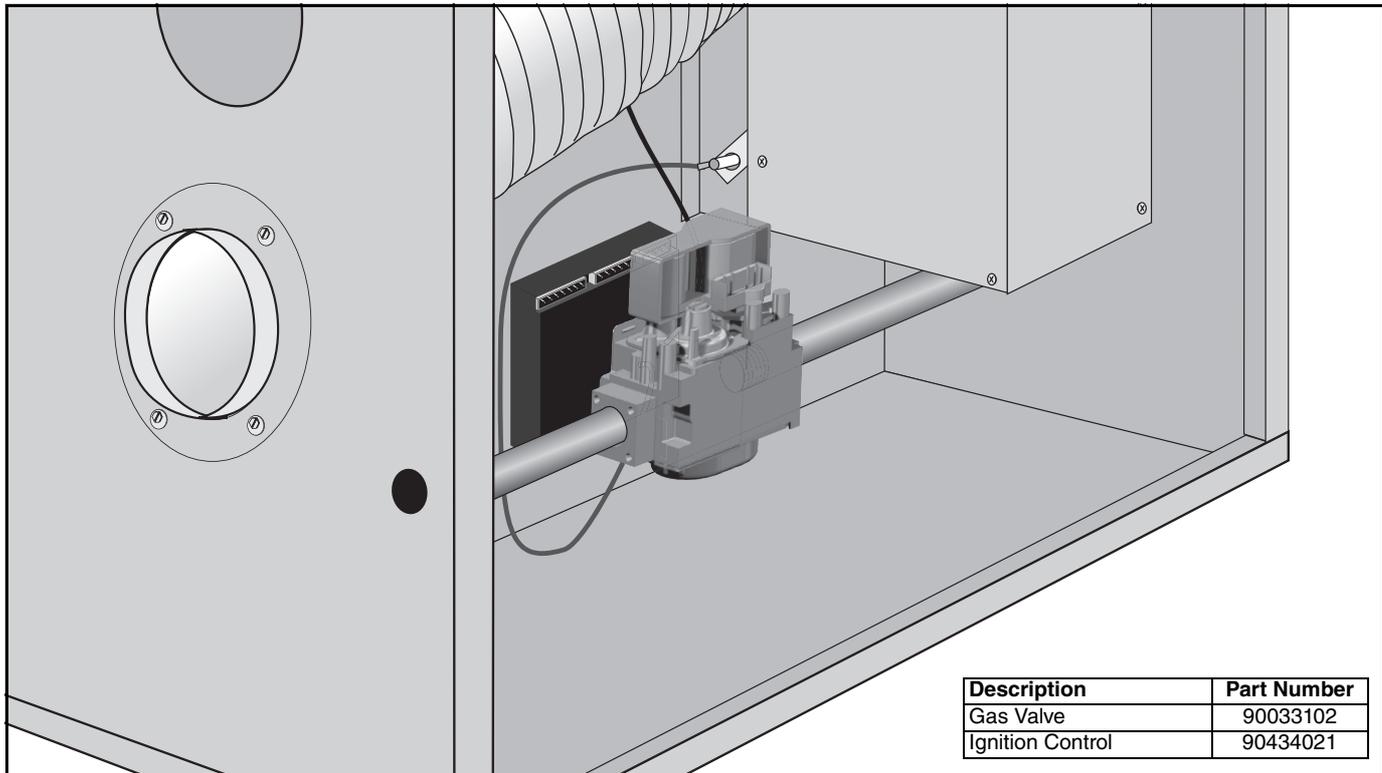
**Burner Components**

All serviceable burner parts are accessed by the door on the right side of the heater. Use a screwdriver to turn the latch 90°. See Page 8, Section 5.

**16.1 Gas Valve**

Remove the gas supply pipe at the heater inlet.

**16.1.1 Models 7 - 32**

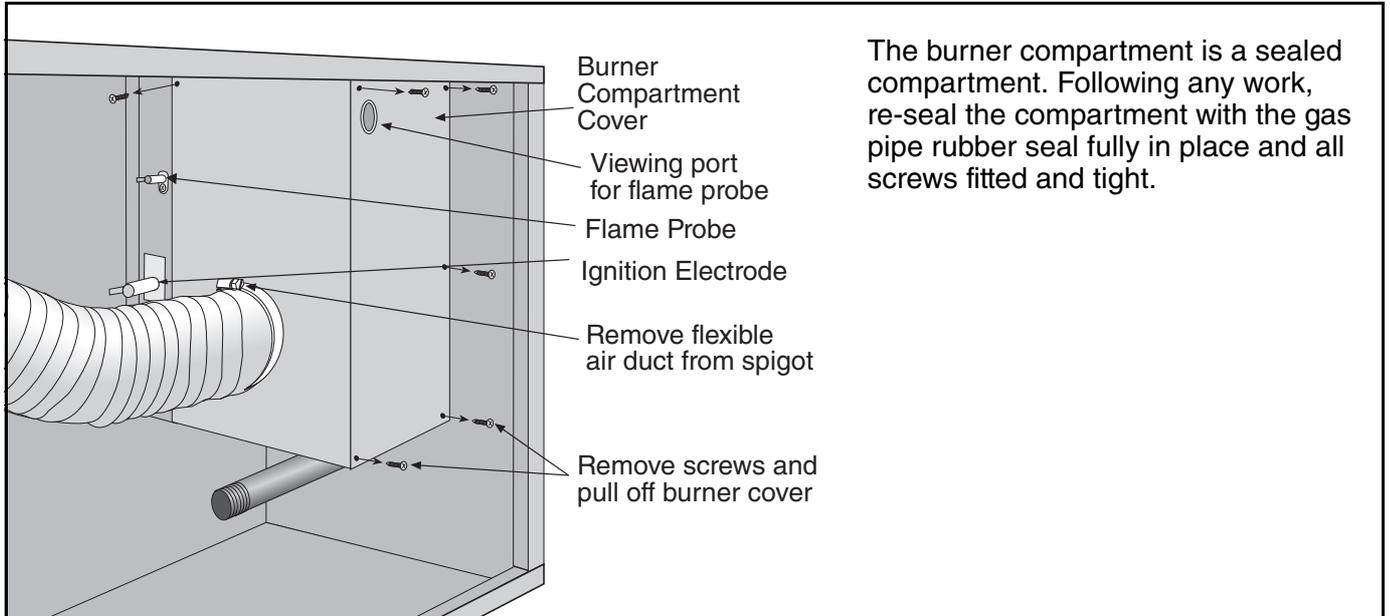


**16.1.2 All Models**

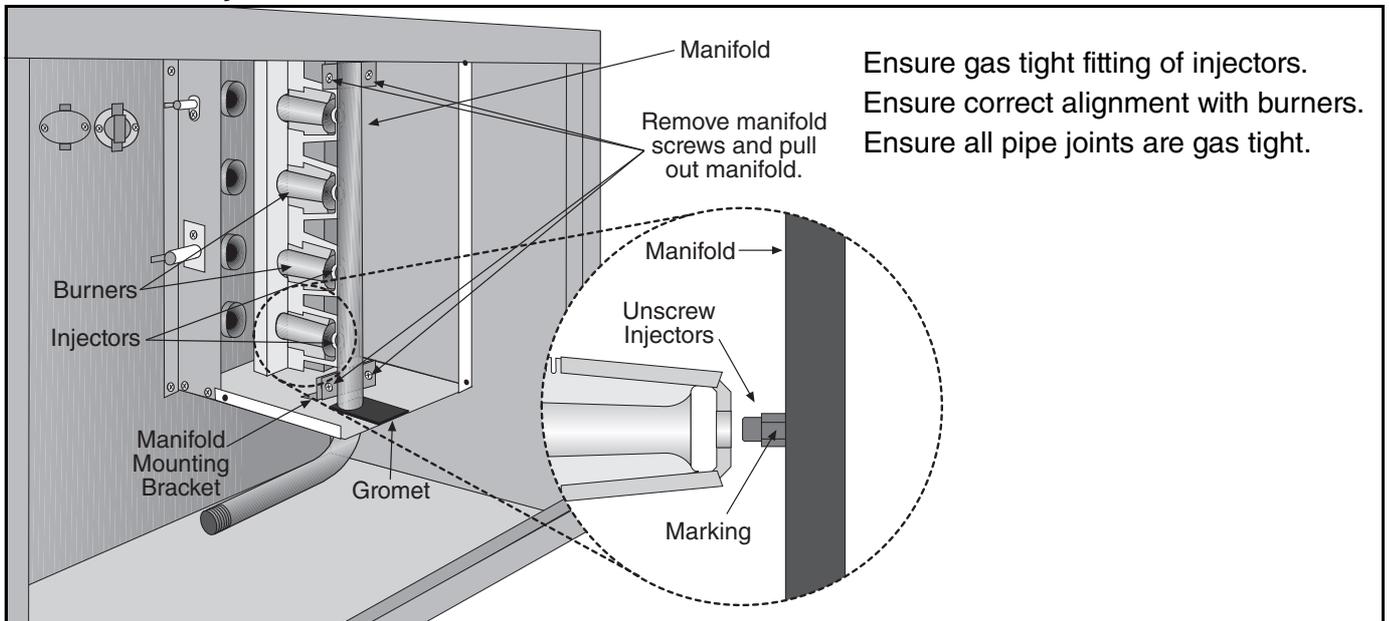
Replace in reverse order. Verify that the gas flow direction of the valve is correct. Use a minimum amount of gas seal on the thread joint. Re-use the "O" ring seal in the outlet flange where fitted. Check that all the joints are leak free. Reset gas valve. See Page 23, Section 11.4.2.

**IT IS IMPORTANT THAT ONLY THE CORRECT GAS VALVES SPECIFIED FOR EACH MODEL TYPE ARE USED WHEN REPLACING THESE CONTROLS.**

## 16.2 Burner Compartment

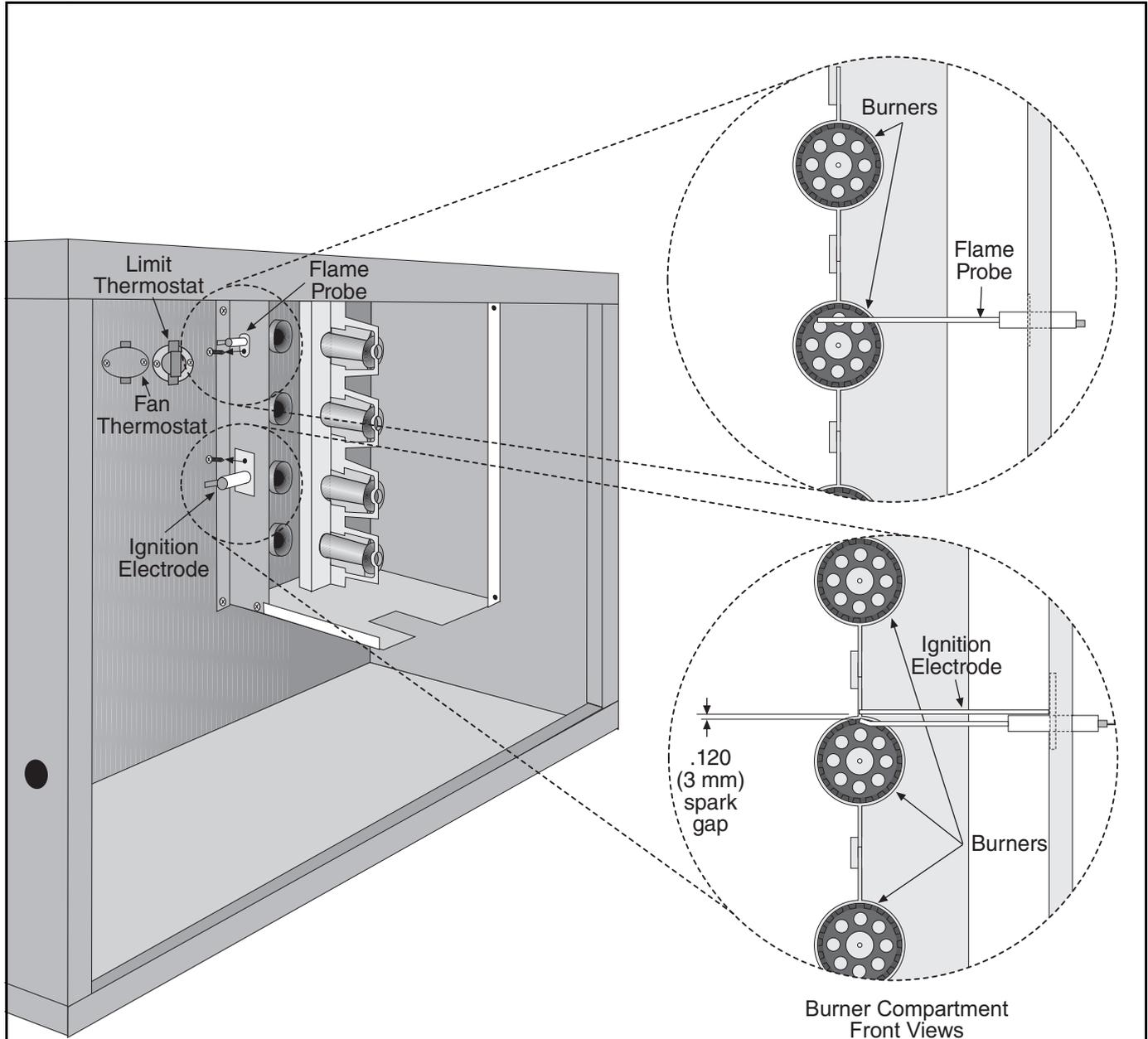


### 16.2.1 Burner Injectors



MODEL	CTCU-7	CTCU-11	CTCU-15	CTCU-22	CTCU-27	CTCU-32
Injector Quantity	2	3	4	5	6	7
<b>Natural Gas (G20)</b>						
Injector size mm Ø	1.78	1.85	1.85	2.06	2.057	2.057
in Ø	0.070	0.073	0.073	0.081	0.081	0.081
Marking	50	49	49	46	46	46
RG P/N	91930050	91930049	91930049	91930046	91930046	91930046
<b>Natural Gas (G25)</b>						
Injector size mm Ø	1.99	2.06	2.06	2.26	2.261	2.261
in Ø	0.0785	0.081	0.081	0.089	0.089	0.089
Marking	47	46	46	43	43	43
RG P/N	91930047	91930046	91930046	91930043	91930043	91930043
<b>LPG Propane (G31) and LPG Butane (G30)</b>						
Injector size mm Ø	1.18	1.18	1.18	1.25	1.25	1.25
in Ø	0.0465	0.0465	0.0465	0.049	0.049	0.049
Marking	56	56	56	1.25	1.25	1.25
RG P/N	91930056	91930056	91930056	91930125	91930125	91930125

16.3 Ignition Electrode and Flame Probe



To replace the ignition electrode or flame probe, remove the electrical lead and screw. Pull out from mounting. Refit in reverse ensuring that the gap to burner is as shown in the front view of the burner compartment.

Description	Part Number
Spark Electrode	90427411
Automatic Ignition Flame Probe	90439300
Burners	92000002
Fan Thermostat	90412102
Limit Thermostat	90412100

## 16.4 Flue Fan Vertical Installation (Models 7 - 15)

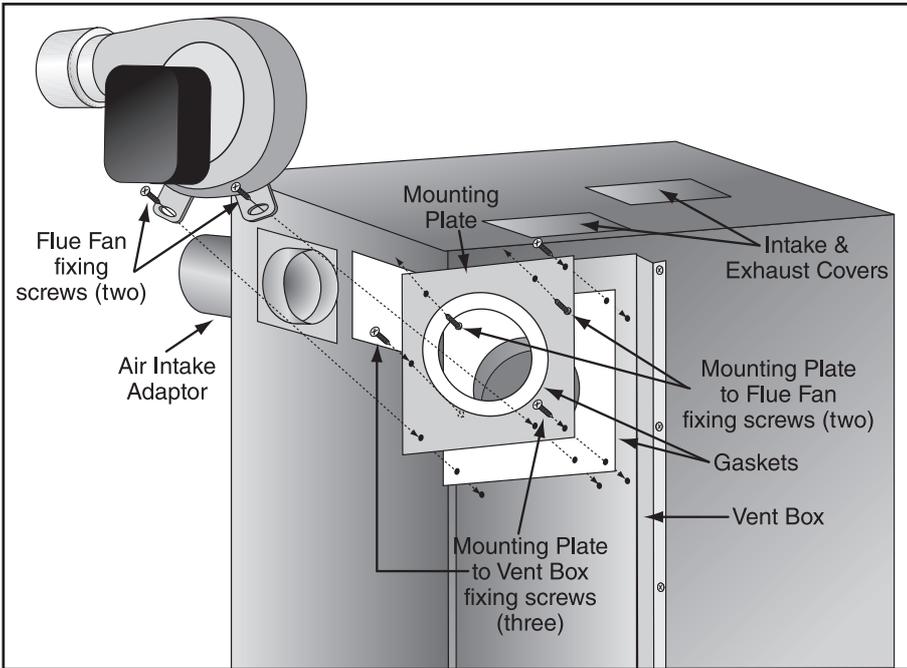
1. To remove the fan, remove 3 screws securing the fan/ mounting plate to the vent box.
2. To remove the fan from the mounting plate, remove the 4 screws.
3. Refit in reverse order.
4. To change the flue and air intake orientation from back to top, remove the fan/mounting plate as explained in Steps 1 and 2.
5. Remove intake and exhaust cover(s) from top of the heater.
6. Rotate the fan, mounting plate and gasket clockwise until the flue adapter lines up with the top hole. Secure with 3 screws.
7. Remove the flexible duct from the air intake adaptor on the back.
8. Remove the air intake adaptor from the back of the heater. Install in the appropriate hole on top.
9. Reconnect the flexible duct.
10. Install intake and exhaust cover(s) over the holes on the back of the heater.
11. Ensure sealed joints. Ensure mounting plate orifice is clear and not obstructed.

MODEL		CTCU-7	CTCU-11	CTCU-15
Flue Fan		Fasco 7021-11767	Fasco 7021-11767	Fasco 7021-11767
RG P/N		90710470	90710470	90710470
Air Plate	mm Ø	35	44	57
	in Ø	1.38	1.75	2.25
RG P/N		1111210	11112210	11113210

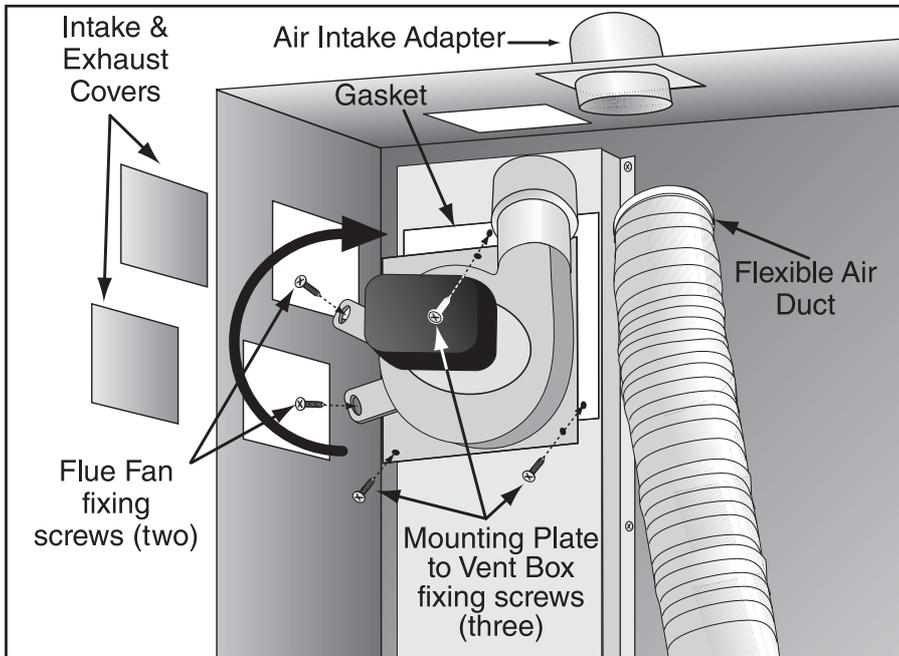
**IT IS IMPORTANT THAT ONLY THE CORRECT FLUE FAN SPECIFIED FOR EACH MODEL TYPE IS USED WHEN REPLACING THESE ITEMS.**

Carry out a commission after working on or changing a flue fan. See *Page 25, Section 12*.

16.5 Flue Fan Vertical Installation (Models 22 - 32)



1. To remove the fan, remove 5 screws securing the fan/ mounting plate to the vent box.
2. To remove the fan from the mounting plate, remove the 2 screws.
3. Refit in reverse order.
4. To change the flue and air intake orientation from back to top, remove the fan/mounting plate as explained in Steps 1 and 2.
5. Rotate the motor 90° counter-clockwise and reinstall the 3 screws.
6. Remove intake and exhaust cover(s) from top of the heater.
7. Rotate the fan, mounting plate and gasket clockwise until the flue adaptor lines up with the top hole. Secure with 5 screws.
8. Discard the piece of duct.
9. Install the intake/exhaust cover and install the 3" alum-mylar flex duct (after bending it to a tight radius by hand).
10. Install intake and exhaust cover(s) over the holes on the back of the heater.
11. Ensure sealed joints. Ensure mounting plate orifice is clear and not obstructed.



MODEL		CTCU-22	CTCU-27	CTCU-32
Flue Fan		Sit Controls P1210838	Sit Controls P1210838	Sit Controls P1210838
RG P/N		90710471	90710471	90710471
Air Plate	mm Ø	57	57	64
	in Ø	2.25	2.25	2.5
RG P/N		12114210	12114210	11114210

**IT IS IMPORTANT THAT ONLY THE CORRECT FLUE FAN SPECIFIED FOR EACH MODEL TYPE IS USED WHEN REPLACING THESE ITEMS.**

Carry out a commission after working on or changing a flue fan. See Page 25, Section 12.

## 16.6 Pressure Switch

Pull off 3 way connector. Spring open plastic clips of mounting cradle. Replace with correct type of pressure switch for model. The pressure switches are colour coded for each pressure setting.

**⚠ WARNING**



**Carbon Monoxide Hazard**

**Use correct pressure switch specified for each model.**

**Use of incorrect pressure switch could cause unsafe condition.**

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

Carry out a commission after working on or changing a pressure switch. See *Page 21, Section 11*.

Pressure Switch	CTCU-7	CTCU-11	CTCU-15	CTCU-22	CTCU-27	CTCU-32
RG P/N	90439812	90439812	90439812	90439803	90439810	90439810
Colour Code	orange	orange	orange	grey	black	black
Set Point mbar	0.45	0.45	0.45	1.02	0.82	0.82
in wc	0.18	0.18	0.18	0.41	0.35	0.35

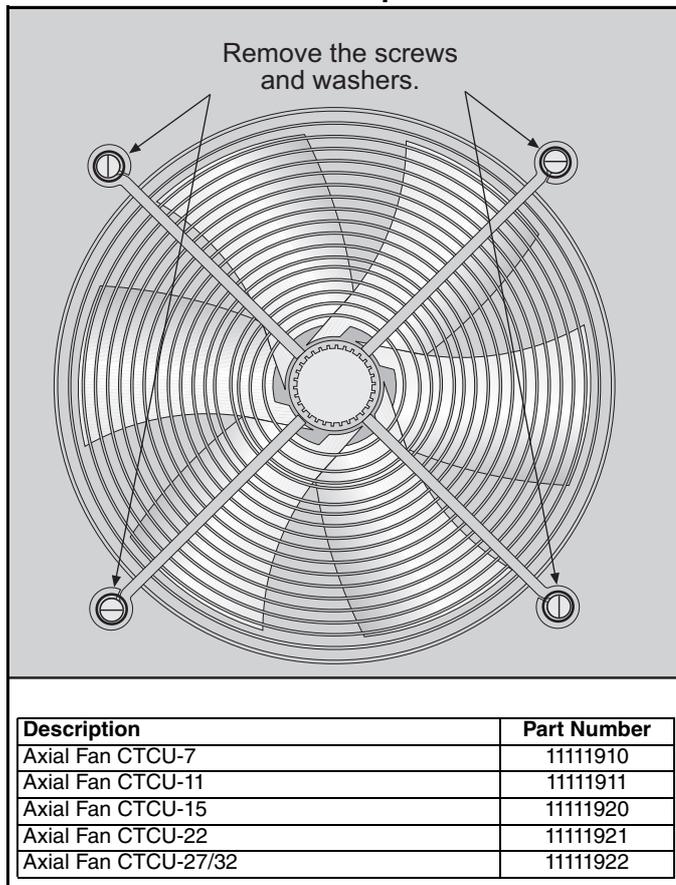
### 16.7 Ignition Control

This control is mounted at the bracket plate. Pull out the three cable connectors. Pull out ignition cable, ignition earth and flame probe cable noting their positions. Located behind the bracket ignition control are the white mounting pins. Depress locking tab while gently pulling bracket away from mounting pins to disengage the bracket. Remove the screws. Refit in reverse. Ensure correct location of ignition and flame probe cables.

### 16.8 CTCUA Axial Fan/Guard/Motor Assembly

The axial fan unit for the CTCUA heater is supplied completely assembled and balanced.

#### 16.8.1 Fan Removal and Replacement



#### 16.8.2 To Replace the Fan Assembly

To replace the fan assembly, reverse the procedure shown above. Fit rubber washers to the guard mountings to reduce vibration.

- Check that the fan blades are free to rotate before turning on the power to the fan.
- Strictly comply with the colour code of the fan wires to ensure correct operation. See Page 20, Section 10.3 wiring diagram.
- Use only genuine replacement parts sold and supplied by Roberts-Gordon.

### 16.9 Fan and Limit Thermostats

#### 16.9.1 Removal and Replacement

1. Pull off the electrical connections to the thermostat
2. Unscrew the two screws securing the thermostat
3. Fit a new thermostat with two screws ensuring that the correct temperature setting and type are selected.  
*See Page 9, Section 5.3.*
4. Reconnect the electrical connections and test operation.



Attach this information to the wall near the ROBERTS GORDON® heater



Read the Installation, Commissioning, Operation and Service Manual thoroughly before installation, operation or service.

**OPERATING INSTRUCTIONS**

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 (above ambient temperature).  
The automatic starting sequence begins.
- NOTE:** Following long shutdown periods, the burner control may go to 'LOCKOUT' during the start sequence. Push the reset button to recommence firing. Contact service department if 'LOCKOUT' continues (see manual for details).

**TO TURN OFF THE HEATER**

1. Turn the thermostat/time switch to 'OFF'. The burner will turn 'OFF' immediately, but fans will continue to cool heat exchanger until the fan thermostat switches off.

**IF THE HEATER WILL NOT OPERATE, TO ENSURE YOUR SAFETY, FOLLOW THESE INSTRUCTIONS TO SHUT DOWN YOUR HEATER**

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.

**⚠ WARNING**

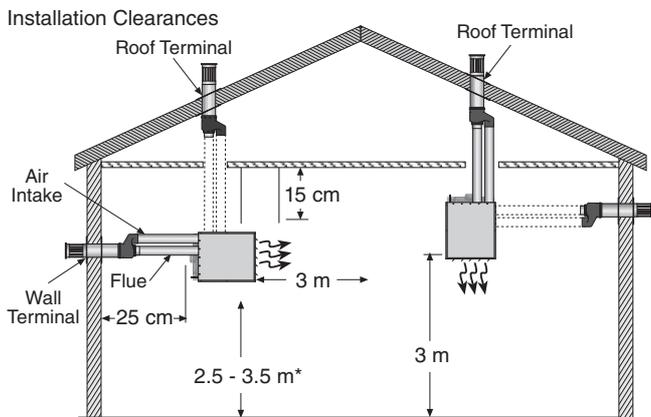


**Fire Hazard**

Some objects can catch fire or explode when placed close to heater.

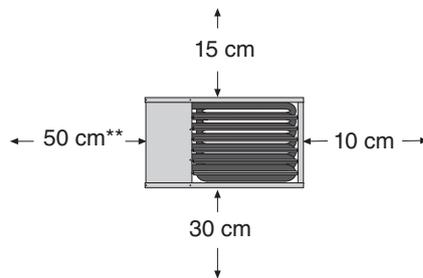
Keep all flammable objects, liquids and vapors the required clearances to combustibles away from heater.

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



\*Heaters may be mounted at a higher level if destratification fans are installed.

**Clearances to Combustibles**



\*\*80 cm is necessary to service heater

**Roberts-Gordon Europe Limited**  
Unit A, Kings Hill Business Park  
Darlaston Road, Wednesbury  
West Midlands WS10 7SH UK  
Telephone: +44(0)121 506 7700

Fax: +44(0)121 506 7701  
Service Telephone: +44(0)121 506 7709  
Service Fax: +44(0)121 506 7702  
E-mail: uksales@rg-inc.com  
E-mail: export@rg-inc.com

**Roberts-Gordon, LLC**  
1250 William Street  
P.O. Box 44  
Buffalo, NY 14240-0044 USA

Telephone: 716.852.4400  
Fax: 716.852.0854  
Toll Free: 800.828.7450

**Installation Code and Annual Inspections:**

All installations and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service and operation of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon recommends that a qualified contractor annually inspect your ROBERTS GORDON® equipment and perform service where necessary, using only replacement parts sold and supplied by Roberts-Gordon.

For installations at elevations above 2000' (610 m), the appliance shall be derated 4% for each 1000' (305 m) of elevation above sea level.

**Further Information:** Applications, engineering and detailed guidance on systems design, installation and equipment performance is available through ROBERTS GORDON® representatives. Please contact us for any further information you may require, including the Installation, Commissioning, Operation and Service Manual.  
**These products are not for residential use.**