

Combat®

Tubular Unit Heaters

Installation, Commissioning, Operation & Service Manual

**Model CTU
40 to 115**



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 service technician with necessary information.

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TABLE OF CONTENTS

SECTION 1: Heater Safety	2	SECTION 12: Commissioning	30
1.1 Manpower Requirements	2	12.1 Pre-Commission Checks	30
1.2 Safety Labels and Their Placement.....	2	12.2 Gas Supply	30
SECTION 2: Installer Responsibility	4	12.3 Mechanical Checks	30
2.1 Laminated Wall Plate	4	12.4 Begin Commissioning.....	31
2.2 Corrosive Chemicals.....	4	12.5 Combustion Testing	33
2.3 National Standards and Applicable Regulations	4	12.6 Turning Off the Heater	33
SECTION 3: Clearances to Combustibles	5	12.7 External Controls	33
3.1 Required Clearances to Combustibles.....	5	12.8 Complete the Commissioning.....	33
SECTION 4: Critical Considerations	7	12.9 Instruction to the User	33
4.1 Ventilation	7	SECTION 13: User Instructions	34
4.2 Gas Supply	7	13.1 User Instructions	34
4.3 Electrical Supply	7	13.2 Heater Operation	34
4.4 Flue.....	7	13.3 Common User Controls	35
SECTION 5: Specifications	8	13.4 Lighting Instructions	35
5.1 CTUA	8	13.5 Simple Fault Finding.....	35
5.2 CTUB, CTUC and CTUD	9	SECTION 14: Servicing	36
5.3 General Technical Data Table	10	14.1 Servicing Instructions	36
5.4 Technical Data Table	11	14.2 Burner Maintenance	36
SECTION 6: Heater Installation	12	14.3 Fan/Motor Assembly Maintenance	36
6.1 General	12	14.4 Heat Exchanger Maintenance	37
6.2 Basic Information	12	14.5 Gas Control Valve Maintenance	37
6.3 Location and Suspension	12	14.6 Flue Fan	37
6.4 Handling.....	12	14.7 Maintenance Checklist	37
6.5 Suspension and Shelf Mounting	12	SECTION 15: Conversion Between Gases	39
6.6 Wall Mounting	12	15.1 General.....	39
SECTION 7: Flue Installation	15	15.2 Burner Conversion.....	39
7.1 Flue Installation	15	15.3 Gas Valves.....	39
7.2 Type C ₁₂ , C ₃₂ & C ₆₂ Appliance	15	SECTION 16: Troubleshooting	40
7.3 Type B ₂₂ Appliance.....	15	16.1 General.....	41
SECTION 8: Air Supply	17	16.2 Troubleshooting For Automatic Ignition Burner Systems	42
8.1 Room Sealed Installation.....	17	16.3 Troubleshooting for Flame Supervision System.....	43
8.2 Open Flued Installation.....	17	16.4 Troubleshooting for Solenoid Valves	43
8.3 Building Ventilation.....	17	SECTION 17: Removal and Replacement Parts	44
8.4 Isolated Equipment Rooms.....	17	17.1 Gas Valve	45
SECTION 9: Optional Heater Configurations	18	17.2 Burner Compartment	47
9.1 Distribution Duct Work for CTUB, CTUC and CTUD Heaters	18	17.3 Ignition Electrode and Flame Probe	49
SECTION 10: Gas Pipe Work	19	17.4 Flue Fan	50
10.1 Connections	19	17.5 Pressure Switch	51
SECTION 11: Wiring and Electrical Information	21	17.6 Ignition Control	52
11.1 Electrical Supply	21	17.7 CTUA Axial Fan/Guard/Motor Assembly	52
11.2 Remote Controls	21	17.8 CTUB & CTUC Centrifugal Fan/Guard/Motor Assembly	52
11.3 CTUA Wiring Diagram (Models 40-60)	22	17.9 Fan Data.....	53
11.4 CTUA Wiring Diagram (Models 75-115)	23		
11.5 CTUB/C Wiring Diagram (Models 40).....	24		
11.6 CTUB/C Wiring Diagram (Models 50-60).....	25		
11.7 CTUB/C Wiring Diagram (Models 75-115)	26		
11.8 CTUD Wiring Diagram (Models 40-60)	27		
11.9 CTUD Wiring Diagram (Models 75-115).....	28		
11.10 CTUD External Motor Alternative Wiring & Optional Thermostat/Time Switch.....	29		

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TABLE OF FIGURES

Figure 1: Side and Back Panel Label Placement	2
Figure 2: Side Panel Label Placement	3
Figure 3: Installation Clearances and Clearances to Combustibles	6
Figure 4: Suspension Methods	13
Figure 5: Shelf-Mounting Methods	13
Figure 6: Wall Shelf Mounting and Suspension	14
Figure 7: Flue and Roof Detail	15
Figure 8: Vertical and Horizontal Flue Termination - Type B ₂₂ Appliance	16
Figure 9: Vertical and Horizontal Flue Termination - Type C ₁₂ C ₃₂ & C ₆₂ Appliances	16
Figure 10: Heaters Installed in Isolated Equipment Rooms	17
Figure 11: Ducting	18
Figure 12: Gas Connection with Stainless Steel Flex Connector	20
Figure 13: Sequence of Operation Chart	31
Figure 14: Gas Valve for Heater (Models 40 - 60)	32
Figure 15: Gas Valve for Heater (Models 75 - 115)	32
Figure 16: Heater Operating Sequence	34
Figure 17: Centrifugal Fan Orientation	53

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.



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-domestic indoor spaces. Do not install in domestic spaces. These instructions, the layout drawing, local codes 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 of the heater and the various venting components have sharp edges. To prevent injury, the use of work gloves is recommended.

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

Figure 1: Side and Back Panel Label Placement

The heater must be applied and operated under the general concepts of reasonable use and installed using best business practices.

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 Europe Limited for obtaining replacement signs or labels. See *Page 2, Figure 1 through Page 3, Figure 2*.

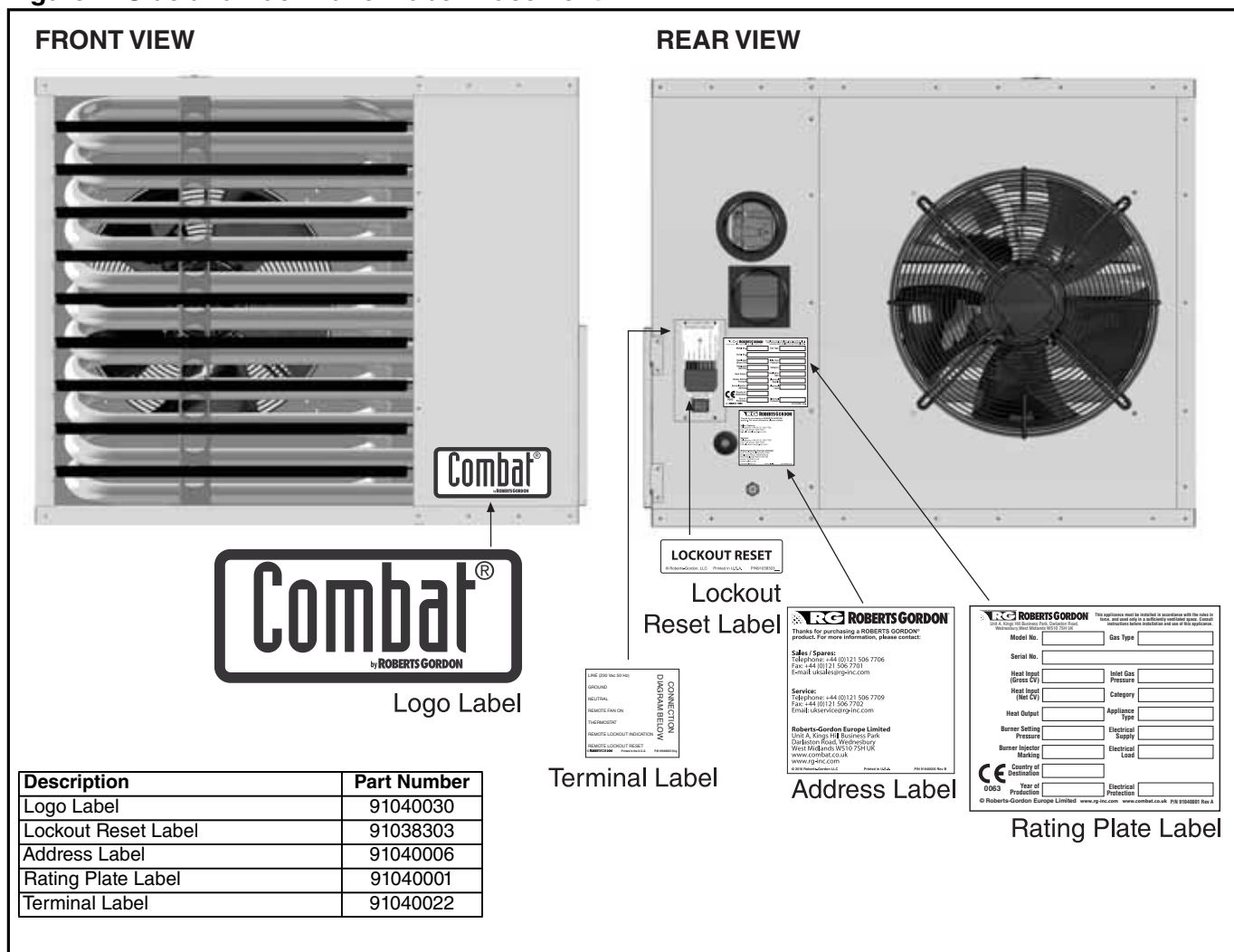
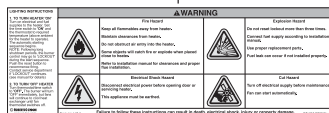
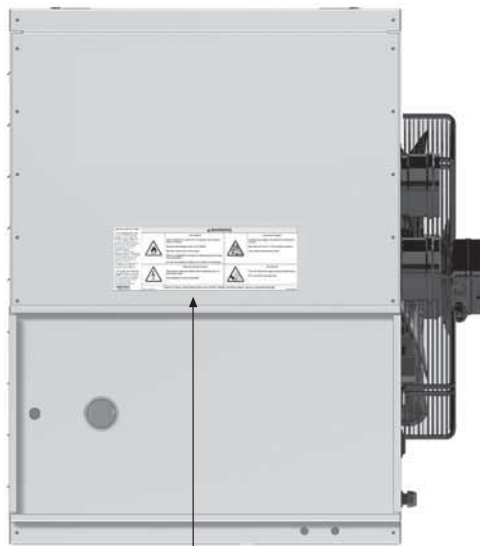


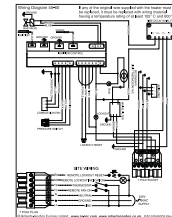
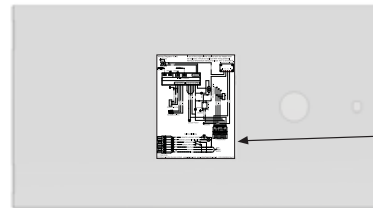
Figure 2: Side Panel Label Placement

ACCESS SIDE VIEW (OUTSIDE)



Lighting Instructions Label

ACCESS SIDE VIEW (INSIDE DOOR)



Wiring Diagram Label

Description	Part Number
Lighting Instruction Label	91040002
Wiring Diagram Label 40-60	91040005
Wiring Diagram Label 75-115	91040004

SECTION 2: INSTALLER RESPONSIBILITY

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and regulations. Roberts-Gordon Europe Limited recommends the installer contact a local authority, building inspector or insurance company for guidance.
- To use the information given in the manual together with the local and national regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles of this heater.
- To apply all needed materials not supplied 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 regulations.
- To safely and adequately install heater using materials that support heater weight.
- To ensure the heater is placed in an approved application.

2.1 Laminated Wall Plate

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

A copy of the wall plate (P/N 91040028) is illustrated on the back cover. Know your model number and installed configuration. Model number and installed configuration are found on the heater and in the Installation, Operation and Service Manual.

2.2 Corrosive Chemicals


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

Roberts-Gordon Europe Limited 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 Regulations

All appliances must be installed in accordance with the latest revision of applicable standards and local and national regulations. 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

⚠ 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.

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.**

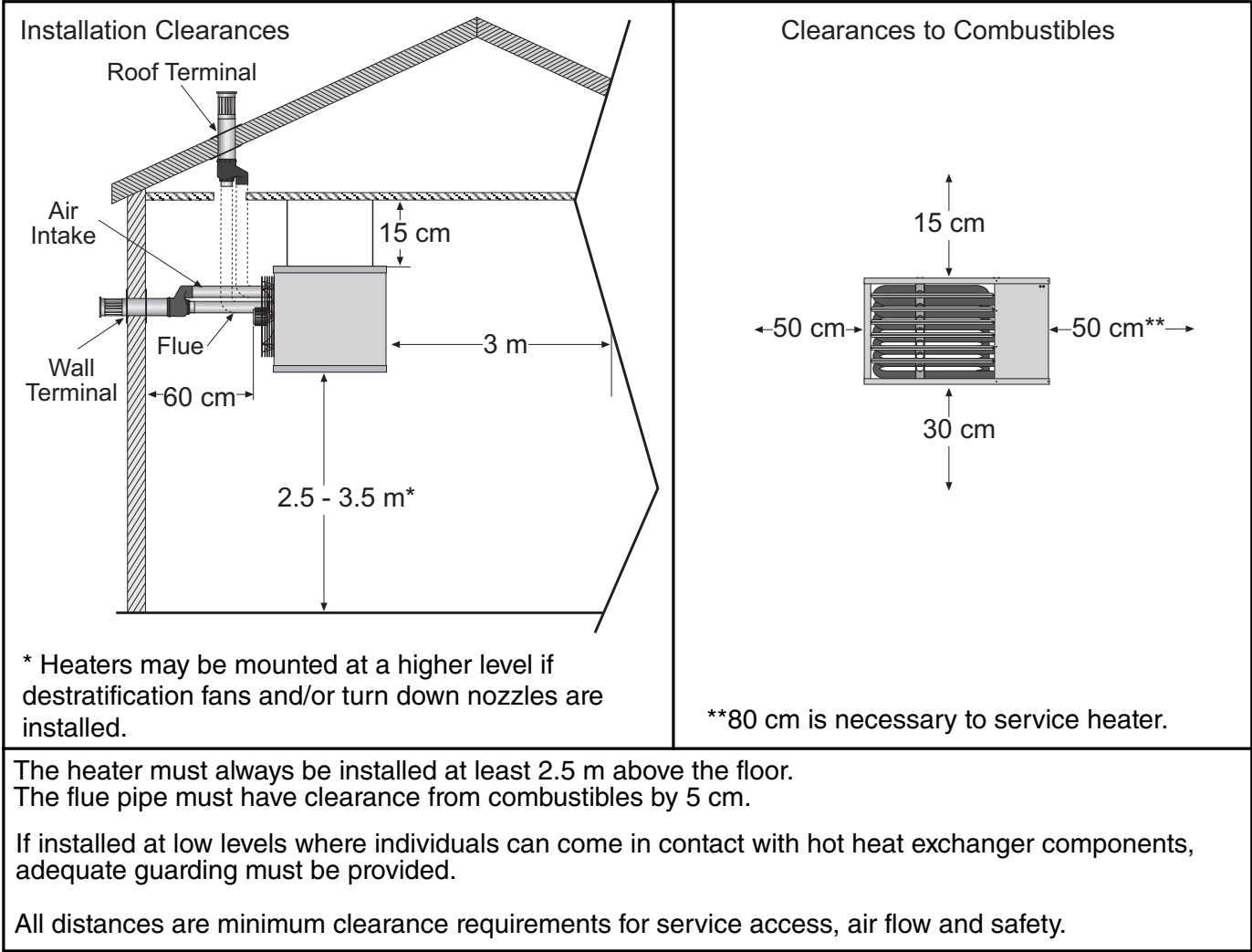
Clearances around the heater and flue must be as indicated on *Page 6, Figure 3* to ensure access for servicing, and correct operation. If clearances to combustibles are not indicated, then installation clearances apply.

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.
- Do not spray aerosols in the vicinity of this appliance.
- The stated clearances to combustibles represents a surface temperature of 50° 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, partitions, 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 12, Section 6* and *Page 13, Figure 4 through Page 14, Figure 6*.
- Affix the tag on a wall near the heater.

Figure 3: Installation Clearances and Clearances to Combustibles



SECTION 4: CRITICAL CONSIDERATIONS**4.1 Ventilation**

! WARNING

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

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

! WARNING

Fire Hazard
Connect gas supply according to Figure 12. Do not use gas supply pipe and electrical connections to support heater's weight. Gas can leak if not installed properly. Failure to follow these instructions can result in death, injury or property damage.

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

! DANGER

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

A permanent 230 V 50 Hz electrical supply is required at the main electrical terminals. The heater also requires suitable energy controls in accordance with *Section 11*.

4.4 Flue

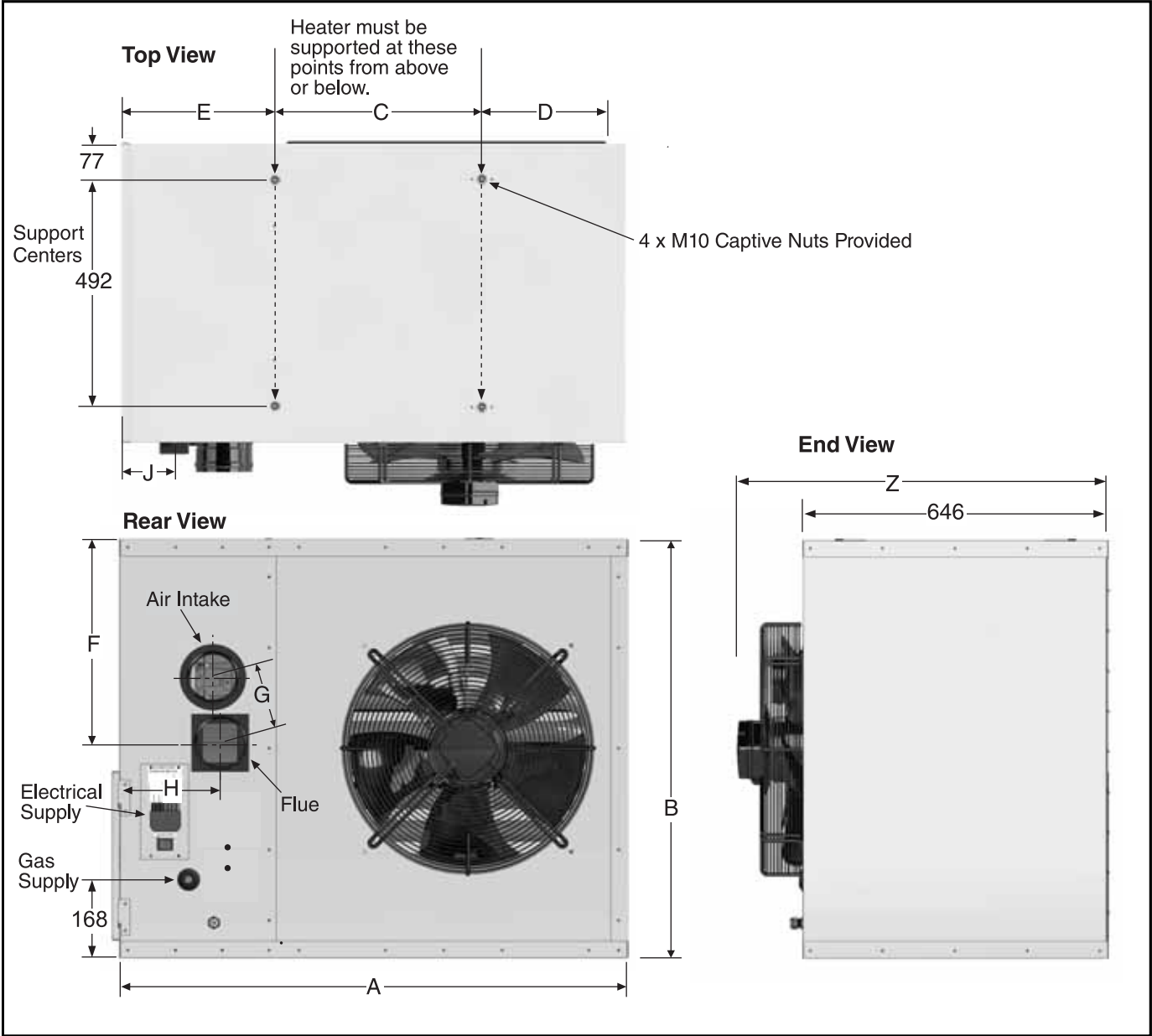
Choose heater siting to allow for the proper location of the flue. Each heater must be fitted with an individual and correctly sized sealed flue system (*See Section 7*).

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

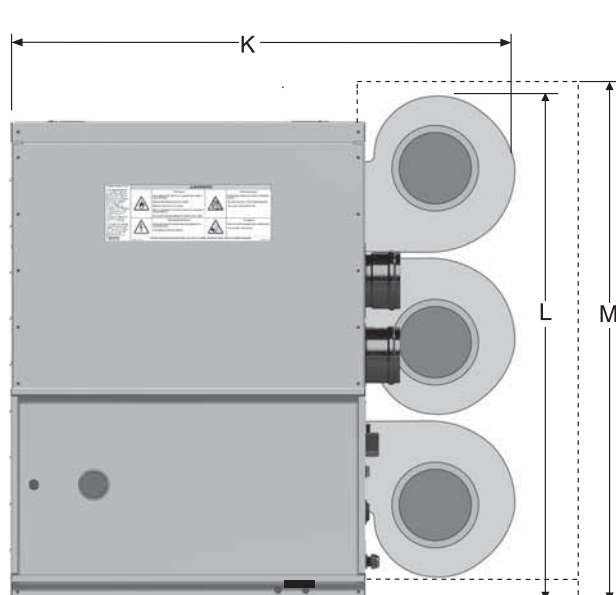
5.1 CTUA



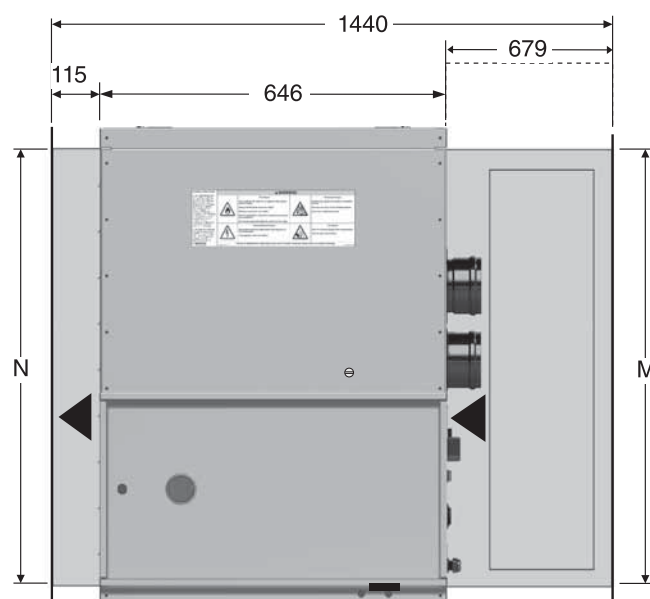
Dimension Data - CTUA (All Models)

		Model	40	50	60	75	90	100	115
A	Width	mm (in)	1075 (42.3)	1075 (42.3)	1075 (42.3)	1327 (52.3)	1327 (52.3)	1327 (52.3)	1327 (52.3)
B	Height	mm (in)	680 (26.8)	895 (35.2)	895 (35.2)	1100 (43.3)	1100 (43.3)	1311 (51.6)	1311 (51.6)
C	Support Spacing	mm (in)	450 (17.7)	450 (17.7)	450 (17.7)	627 (24.7)	627 (24.7)	627 (24.7)	627 (24.7)
D	Support Spacing	mm (in)	312 (12.3)	312 (12.3)	312 (12.3)	312 (12.3)	312 (12.3)	312 (12.3)	312 (12.3)
E	Support Spacing	mm (in)	315 (12.4)	315 (12.4)	315 (12.4)	388 (15.3)	388 (15.3)	388 (15.3)	388 (15.3)
F	Centre of Flue	mm (in)	240 (9.5)	430 (16.9)	430 (16.9)	346 (13.6)	346 (13.6)	537 (21.1)	537 (21.1)
G	Centre of Flue/Air Intake	mm (in)	140 (5.5)	140 (5.5)	140 (5.5)	225 (8.9)	225 (8.9)	225 (8.9)	225 (8.9)
H	Position of Flue	mm (in)	218 (8.6)	211 (8.3)	211 (8.3)	260 (10.2)	260 (10.2)	260 (10.2)	260 (10.2)
J	Gas Inlet Position	mm (in)	150 (5.9)	150 (5.9)	150 (5.9)	220 (8.7)	220 (8.7)	220 (8.7)	220 (8.7)
Z	Length	mm (in)	756 (29.8)	806 (31.8)	806 (31.8)	756 (29.8)	756 (29.8)	806 (31.8)	806 (31.8)
	Flue/Air Intake Pipe Size	mm Ø (in) Ø	100 (3.9)	100 (3.9)	100 (3.9)	130 (5.1)	130 (5.1)	130 (5.1)	130 (5.1)
	Weight	kg	92	115	122	160	169	194	203

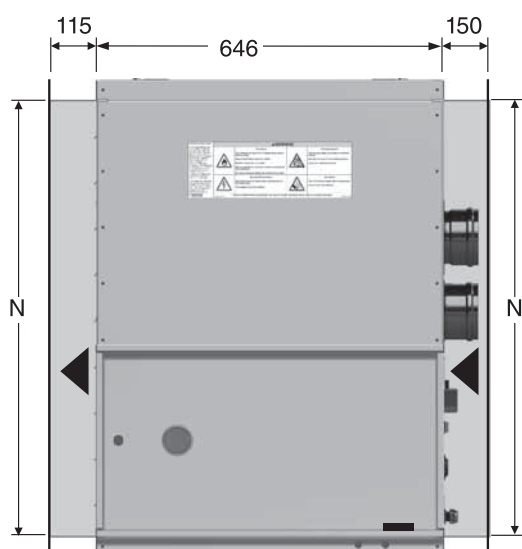
5.2 CTUB, CTUC and CTUD



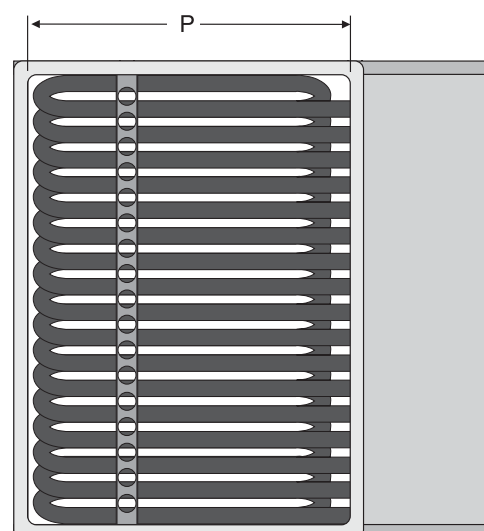
End View
CTUB/C (all models)



End View
CTUC (all models)



End View
CTUD (all models)



Front View
CTUD (and other models fitted with air outlet spigots)

Dimension Data - CTUB, CTUC and CTUD

		Model	40	50	60	75	90	100	115
K	CTUB Depth	mm (in)	1026 (40.4)	1026 (40.4)	1026 (40.4)	1076 (42.4)	1076 (42.4)	1076 (42.4)	1076 (42.4)
L	CTUB Height	mm (in)	680 (26.8)	895 (35.2)	895 (35.2)	1100 (43.3)	1100 (43.3)	1380 (54.3)	1380 (54.3)
M	CTUC Height	mm (in)	610 (24)	895 (35.2)	895 (35.2)	1100 (43.3)	1100 (43.3)	1431 (56.3)	1431 (56.3)
N	Inlet & Outlet Duct Spigot Height	mm (in)	534 (21)	817 (32)	817 (32)	1024 (40.3)	1024 (40.3)	1233 (48.5)	1233 (48.5)
P	Inlet & Outlet Duct Spigot Width	mm (in)	709 (27.9)	707 (27.8)	707 (27.8)	888 (35)	888 (35)	888 (35)	888 (35)
	Weight CTUB	kg	104	139	146	185	210	228	237
	Weight CTUC	kg	117	157	163	206	215	251	260
	Weight CTUD	kg	101	124	131	172	181	200	209

NOTE: Inlet and outlet duct spigot fitted with 30 mm flange.

5.3 General Technical Data Table

	Model	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
CTUA With Axial Fan								
Total Electrical Load	W	415	765	765	655	655	1420	1420
Run Current	A	1.9	3.5	3.5	3.0	3.0	6.5	6.5
Start Current	A	3.3	5.3	5.3	5.8	5.8	10.6	10.6
Air Flow	m³/h	4000	6300	6300	7500	7500	12,600	12,600
Sound Pressure Level at 3 m	[NR] dB(A)	[51] 56	[52.1] 57.1	[52.1] 57.1	[52.3] 57.3	[52.3] 57.3	[52.3] 57.3	[52.3] 57.3
CTUB with Centrifugal Fan and CTUC Range with Centrifugal Fan and Duct Inlet								
Total Electrical Load	W	1530	2920	2920	3310	3310	4880	4880
Normal Run Current	A	5.8	10.8	10.8	11.8	11.8	11.8	17.3
17.3	A	8.7	16.2	16.2	17.7	17.7	24.8	24.8
Normal Speed		Medium	Medium	Medium	Medium	Medium	Medium	Medium
High Run Current	A	7.0	13.4	13.4	15.2	15.2	23.3	23.3
High Start Current	A	10.5	20.0	20.0	22.8	22.8	30.0	30.0
Air Flow	m³/h	3300	5500	5500	6400	6400	9400	9400
Sound Pressure Level at 3 m	[NR] dB(A)	[59] 59.5	[61] 61.5	[61] 61.5	[62] 61.8	[62] 61.8	[63] 64.2	[63] 64.2
CTUD Duct Heater with No Fan								
**Minimum Air Flow Required	m³/h	3300	5500	5500	6400	6400	9400	9400
Pressure Loss Across Heat Exchanger	Pa	30	30	30	30	30	30	30
Flue and Air Intake								
Flue and Air Intake Size	mm Ø	100	100	100	130	130	130	130
*Maximum Straight Flue/Air Intake	m	10	13	15	15	17	20	20

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.

5.4 Technical Data Table

Appliance Category II 2H/L 3B/P

	Model	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
Heat Input Gross CV	kW (Btu/h) x (1000)	47.9 163	61.5 210	70 239	95 325	111 378	119 406	134.7 460
Heat Input Net CV	kW (Btu/h) x (1000)	43 147	55 189	63 215	86 292	100 341	107 365	121 414
Approximate Heat Output	kW (Btu/h) x (1000)	40 135	51 173	58 197	79 267	92 312	98 334	111 379
Thermostat Limit Thermodisc								
CTUA,B/C,D	°C	75	75	75	75	75	75	75
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 (in)	9.5 (3.8)	9.7 (3.5)	9.7 (3.9)	6.1 (2.45)	6.0 (2.4)	6.2 (2.5)	6.3 (2.53)
Gas Rate	m³/h ft³/h	4.5 160	5.8 206	6.6 234	9.0 319	10.5 371	11.3 398	12.8 451
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 (in)	14.2 (5.7)	8.0 (3.2)	7.7 (3.1)	9.2 (3.7)	9.3 (3.73)	9.2 (3.7)	10.2 (4.1)
Gas Rate	m³/h ft³/h	4.78 169	6.14 217	6.98 247	9.49 335	11.06 391	11.86 419	13.43 474
LPG Gas 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 (in)	31.4 (12.6)	28.1 (11.3)	27.2 (10.9)	25.6 (10.27)	27.3 (10.96)	25.3 (10.2)	25.9 (10.4)
Gas Rate	m³/h kg³/h liquid/h	1.77 3.27 6.4	2.27 4.21 8.3	2.58 4.79 9.4	3.51 6.50 12.8	4.09 7.58 14.9	4.39 8.13 16.0	4.97 9.21 18.1
LPG Gas 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 (in)	23.7 (9.5)	19.4 (7.8)	20.2 (8.1)	18.3 (7.3)	19.4 (7.8)	18.3 (7.3)	18.7 (7.5)
Gas Rate	m³/h kg³/h liquid/h	1.34 3.26 5.7	1.72 4.19 7.3	1.95 4.77 8.3	2.65 6.47 11.3	3.09 7.55 13.2	3.32 8.09 14.1	3.75 9.17 16.0
Gas Connection								
CTUA,B/C,D		R - 1/2"	R - 1/2"	R - 1/2"	R - 3/4"	R - 3/4"	R - 3/4"	R - 3/4"

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

CTU 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.
- May be mounted on a shelf of non-combustible material. (See Page 13, Figure 5, Page 14, Figure 6 and the Dimension Data Tables on Page 8, Section 5.1 and Page 9, Section 5.2 for support points).
- May be suspended from above (See Page 13, Figure 4) or from wall brackets of sufficient strength to support the heater as listed in the Dimension Data Tables on Page 8, Section 5.1 and Page 9, Section 5.2. 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 CTU 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 13, 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 14, Figure 6. 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 9.0 mm (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.

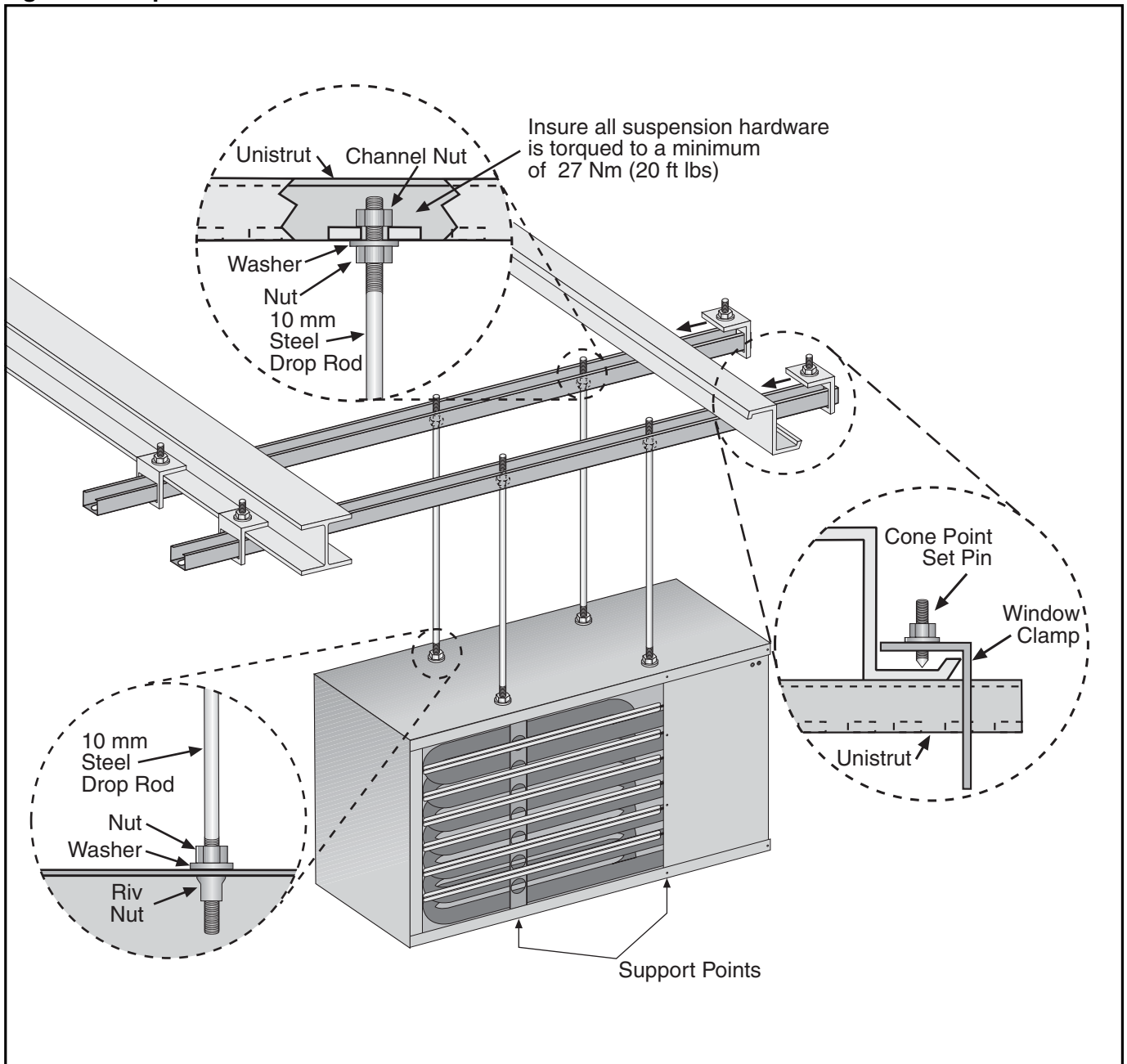
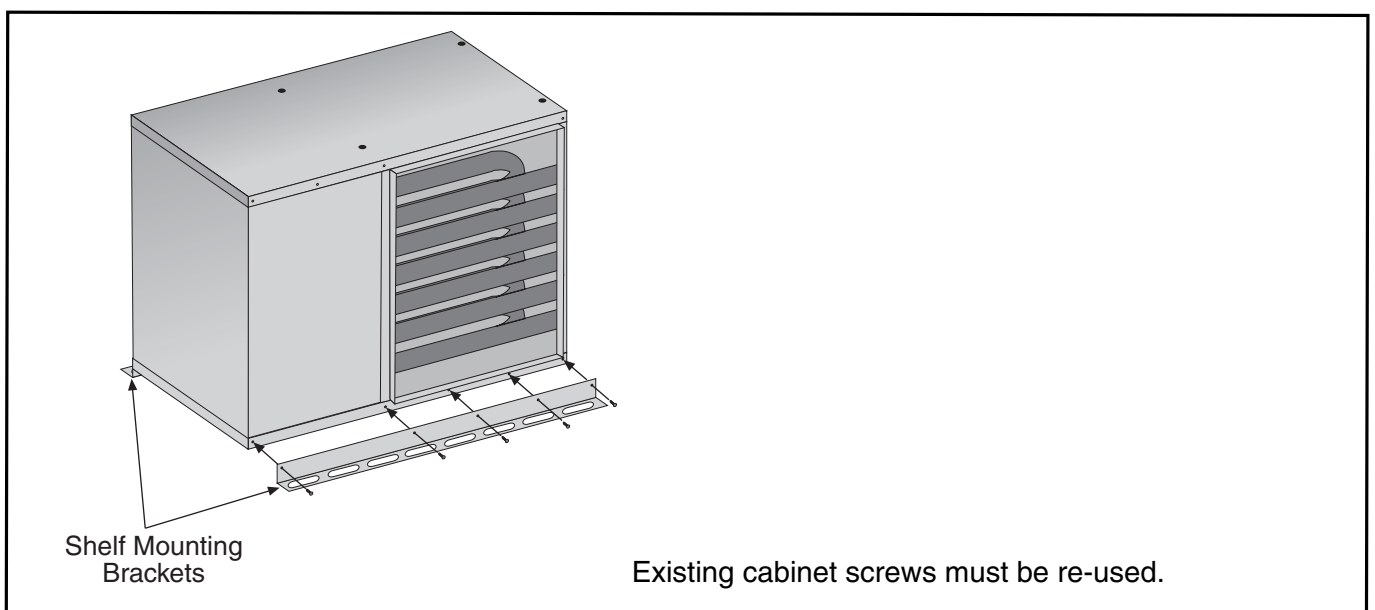
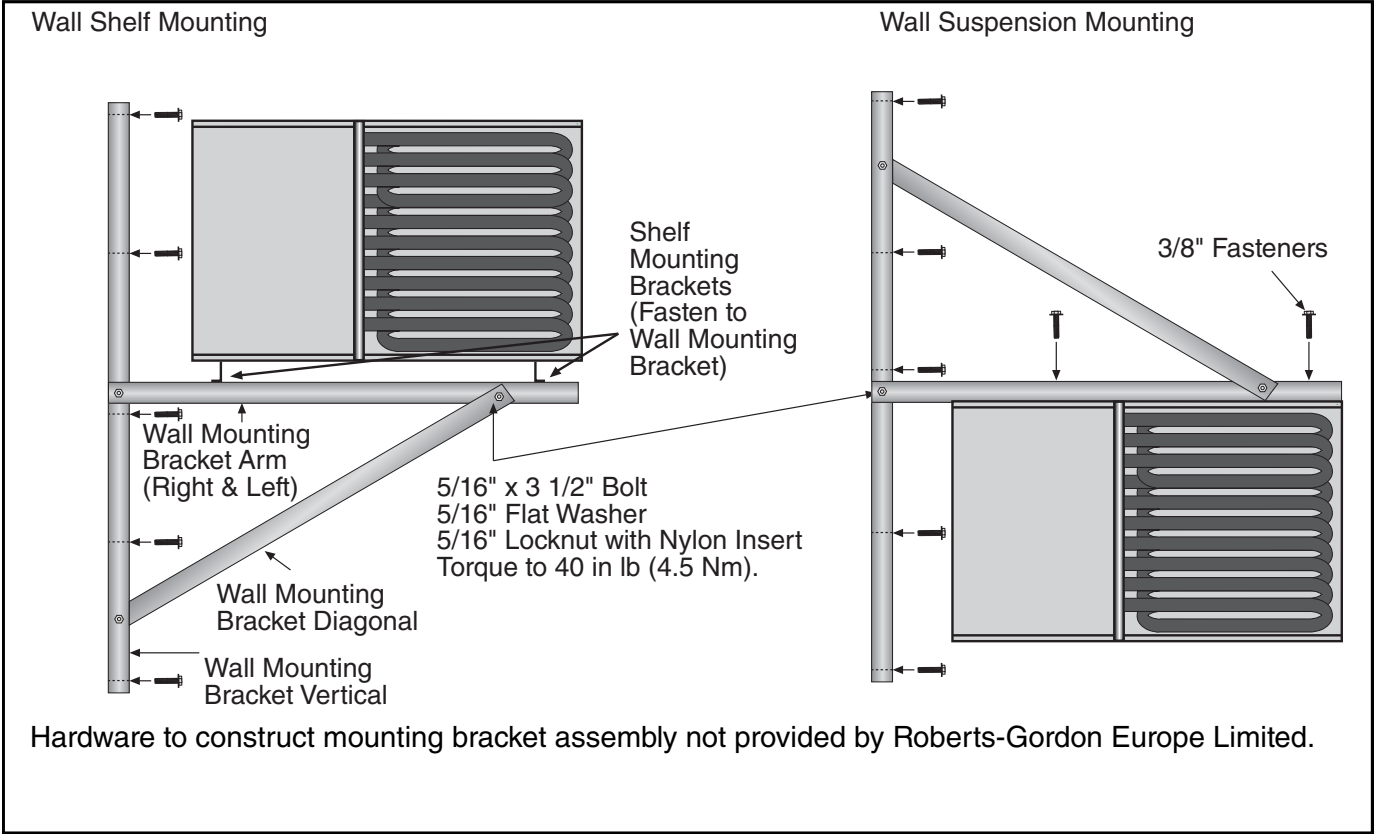
Figure 4: Suspension Methods**Figure 5: Shelf-Mounting Methods**

Figure 6: Wall Shelf Mounting and Suspension



SECTION 7: FLUE INSTALLATION

7.1 Flue Installation

! WARNING**Carbon Monoxide Hazard**

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**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**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

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 15, Figure 7 through

Page 16, 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 15, Figure 7 through Page 16, Figure 9.

7.2 Type C₁₂, C₃₂ & C₆₂ 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 16, Figure 9. The wire mesh be fitted inside the fresh air adapter on the heater and must be removed prior to installation.

7.3 Type B₂₂ Appliance

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

See Page 15, Figure 7 through Page 16, Figure 8.

Figure 7: Flue and Roof Detail

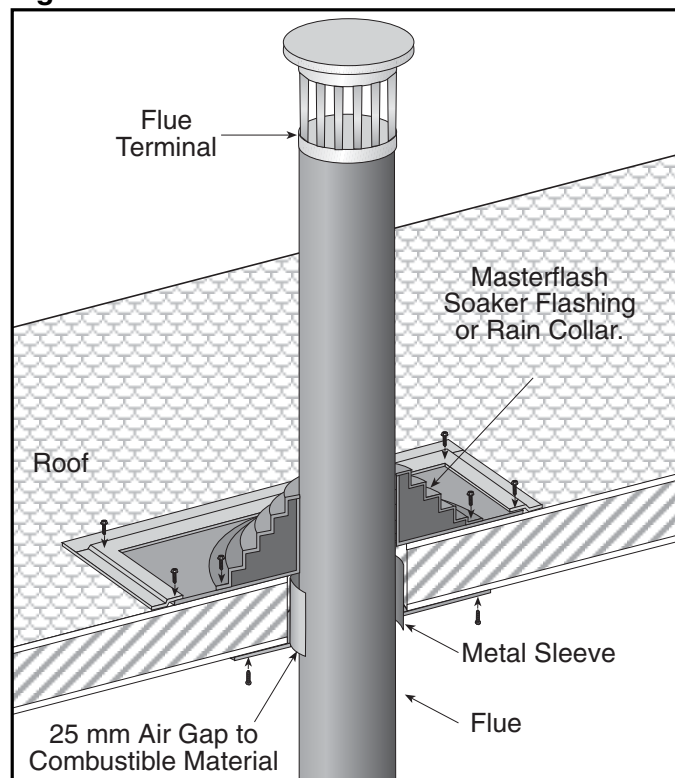


Figure 8: Vertical and Horizontal Flue Termination - Type B₂₂ Appliance

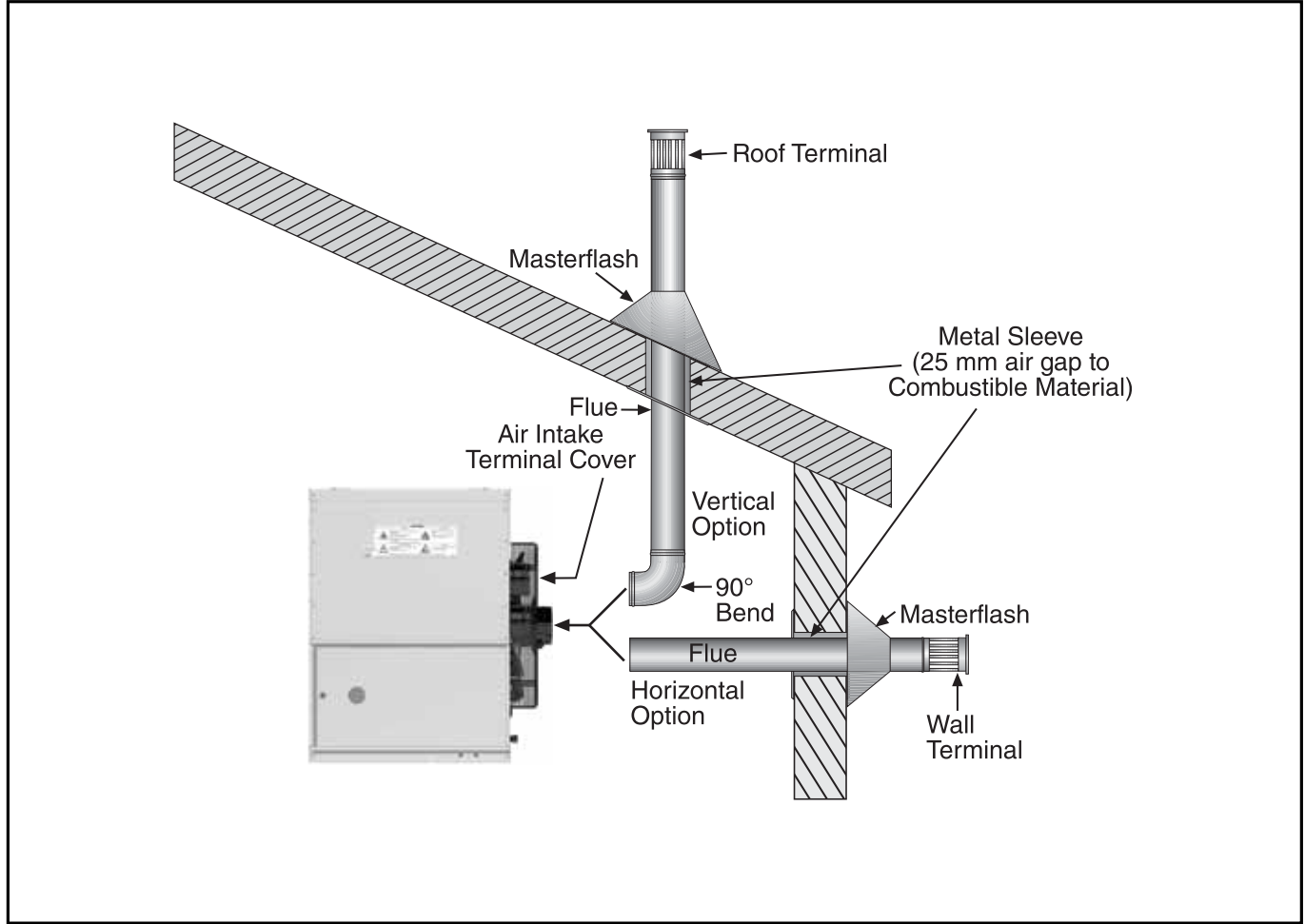
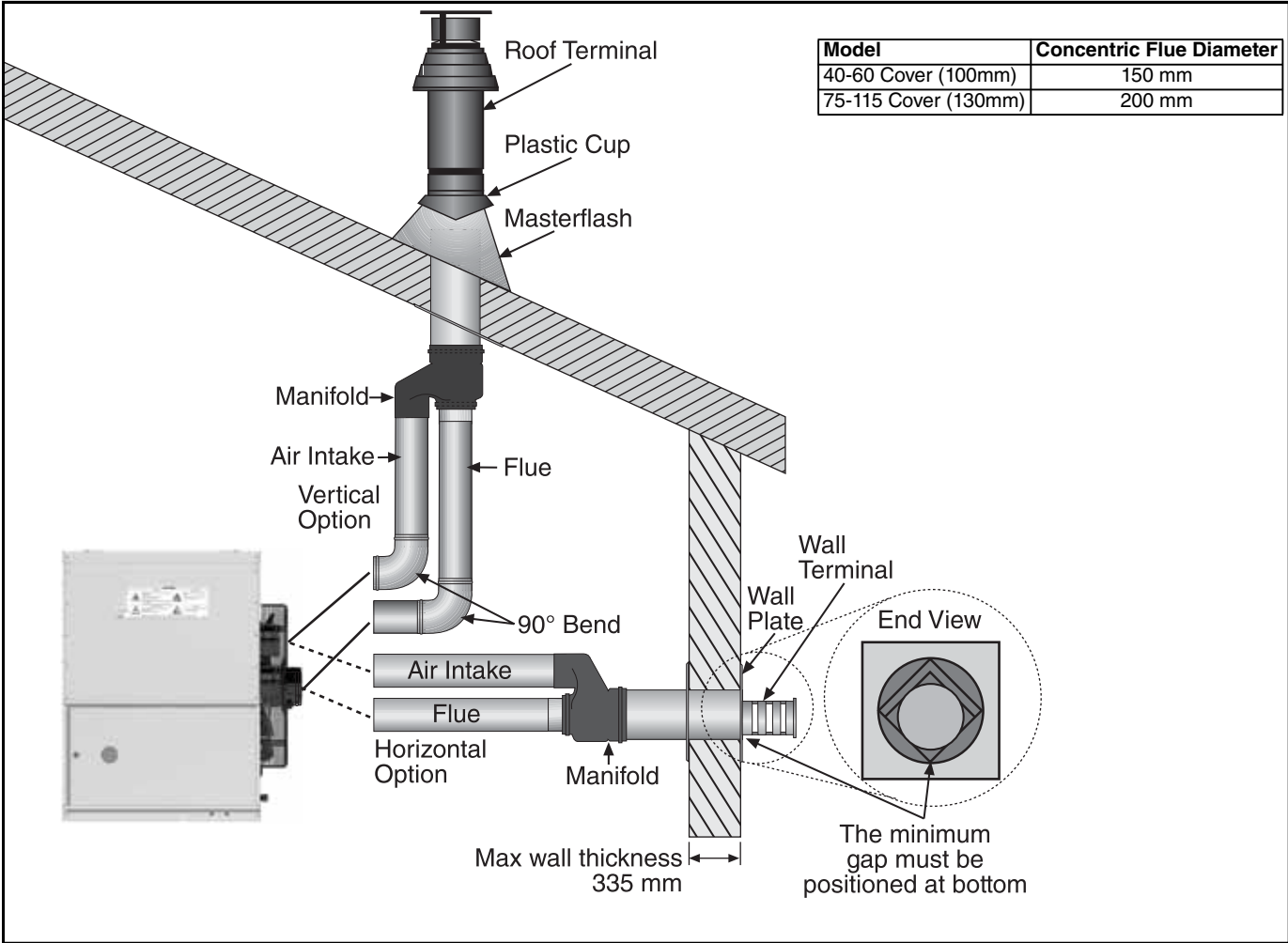


Figure 9: Vertical and Horizontal Flue Termination - Type C₁₂ C₃₂ & C₆₂ Appliances



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 16, Figure 8.

8.2.1 Heaters Installed Within the Heated Space

Where the volume of the heated space is greater than 4.7 m³ 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 cm² per kW of rated heat input
- Heaters above 70 kW heat input: 350 cm² + 2.5 cm² per kW of rated heat input above 70 kW

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.

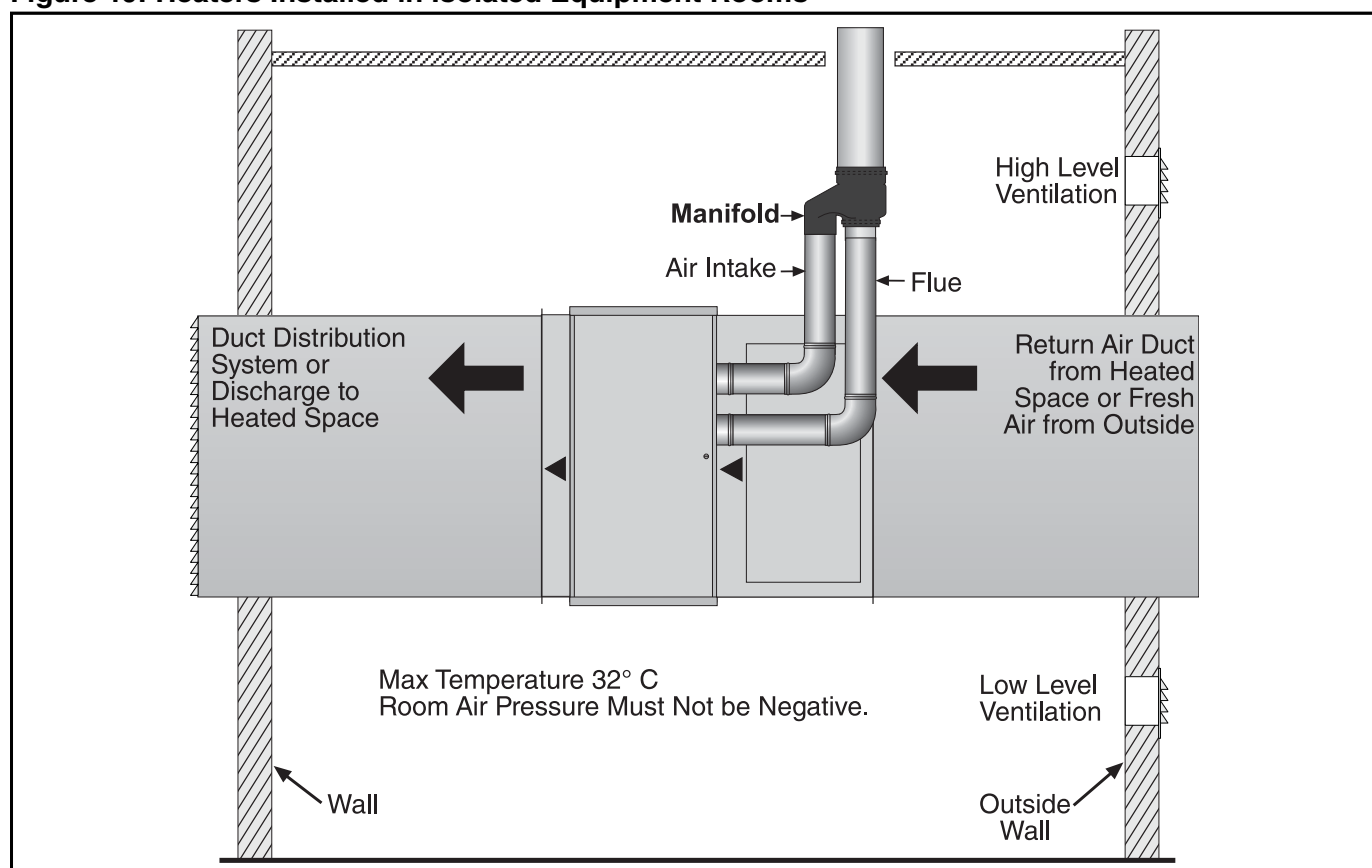
8.4 Isolated Equipment Rooms

Ventilation must prevent the isolated equipment room temperature from exceeding 32° C as well as prevent any negative air pressure within the room. See Page 17, Figure 10. Any isolated equipment room containing air heaters will require permanent air vents direct to outside air in compliance with local codes.

Where natural ventilation is used, suitable permanent openings at low and high level, communicating directly with the outside air, must be provided.

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.

Figure 10: Heaters Installed in Isolated Equipment Rooms



SECTION 9: OPTIONAL HEATER CONFIGURATIONS

9.1 Distribution Duct Work for CTUB, CTUC and CTUD Heaters

CTUC heaters have the fans enclosed so that the heater may be connected to inlet ducting.

CTUD heaters are supplied with inlet and outlet duct spigots for mounting the heater into a customer designed duct system for use with an external fan system.

It is recommended that flexible duct connectors are used to reduce duct born noises.

When installing CTUD heaters onto ducting force the fan to run.

Do not rely on the fan thermostat to turn it on.

Any such device must be in parallel with the fan thermostat so that the fan run-on operation will still operate.

Contact Roberts-Gordon Europe Limited Design Department for recommendations regarding duct resistance and design. Tel: +44 (0) 121 506 7700

9.1.1 CTUD Heaters

For CTUD heaters, it is essential that the airflow in the duct system is at least that specified in the Data Sheet on *Page 9, Section 5.2* and in the correct direction across the heat exchanger as indicated by the arrow on the heater. Higher air flows are permitted, but will cause a lower exiting air temperature. It is recommended that the fan is positioned to blow the air through the heat exchanger.

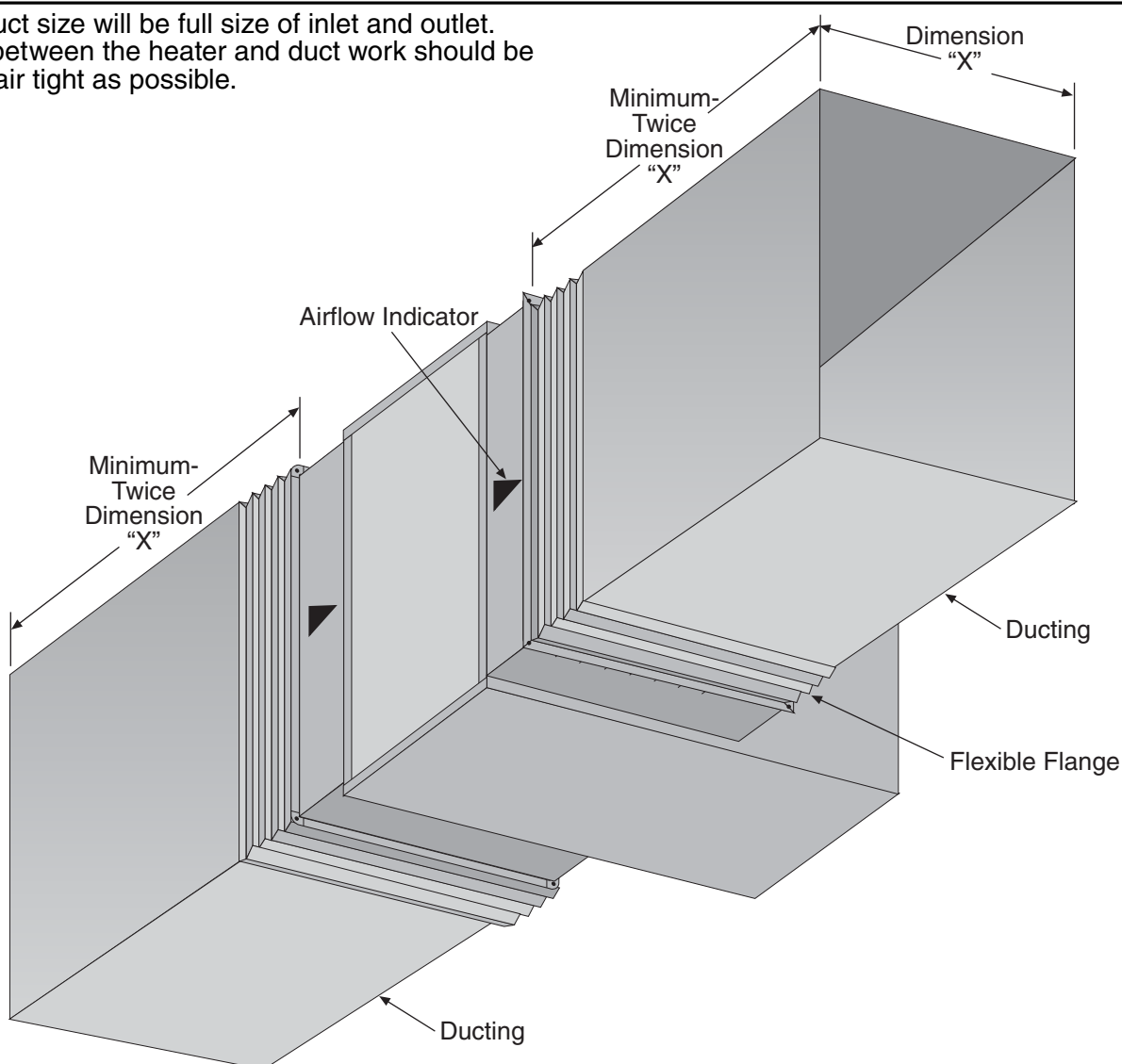
The duct must be designed as described on *Page 18, Section 9.1* and *Figure 11* to ensure that there is a homogenous air flow across the whole of the heat exchanger.

Failure to provide a suitable air flow properly distributed across the heat exchanger will reduce the life of the heat exchanger.

The fan motor, or its control, must contain a method of overload protection. When installed remote from the heater, the fan must be supplied via a local electrical isolator positioned and properly labeled to prevent inadvertent operation.

Figure 11: Ducting

NOTE: Duct size will be full size of inlet and outlet. All joints between the heater and duct work should be made as air tight as possible.



SECTION 10: GAS PIPE WORK

! WARNING**Fire Hazard**

Tighten gas line fittings to connect gas supply according to Figure 12.

Flex gas line can crack when twisted.

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

- 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 regulations.

! 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.

- **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.

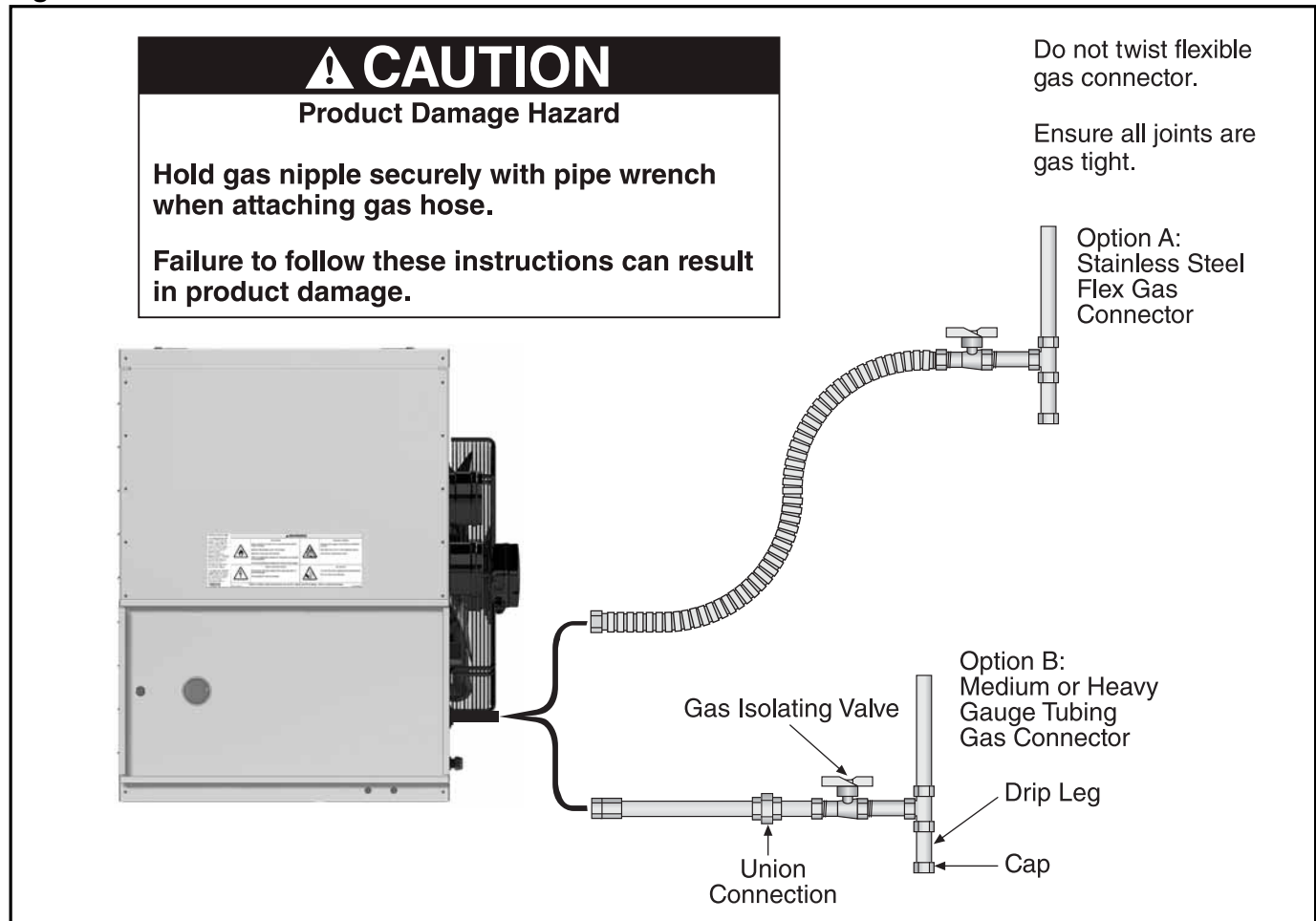
A gas meter is connected to the service pipe by the gas supply company. An existing meter should be checked, preferably by the gas supplier, to ensure that the meter is adequate for the rate of gas supply required.

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

10.1 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 regulations.

Figure 12: Gas Connection with Stainless Steel Flex Connector

SECTION 11: WIRING AND ELECTRICAL INFORMATION

⚠ DANGER

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

11.1 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 IEE and local regulations and be carried out by a qualified electrician.

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.

External fuse protection must be sized in accordance with electrical load requirements on *Page 10, Section 5.3*.

CTUD heaters must have the external fan, or its control connected to Terminal 1 so that the fan run-on function at close down operates correctly.

11.2 Remote Controls

The heater is designed to be operated by controls installed remote from the heater. *See Page 22, Section 11.3. through Page 23, Section 11.4.*

11.2.1 Burner Controls (Thermostat)

Controls to operate the burner: CTU 75 - 115 connect between terminals 2 & 3 of the main terminal block. CTU 40 - 60: connect controls between T₂ and L₁.

11.2.2 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.

11.2.3 Remote Frost Thermostat

Controls to operate the burner: CTU 75 - 115 connect between terminals 2 & 3 of the main terminal block. CTU 40 - 60: connect controls between T₂ and L₁.

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

See Page 22, Section 11.3 through Page 23, Section 11.4.

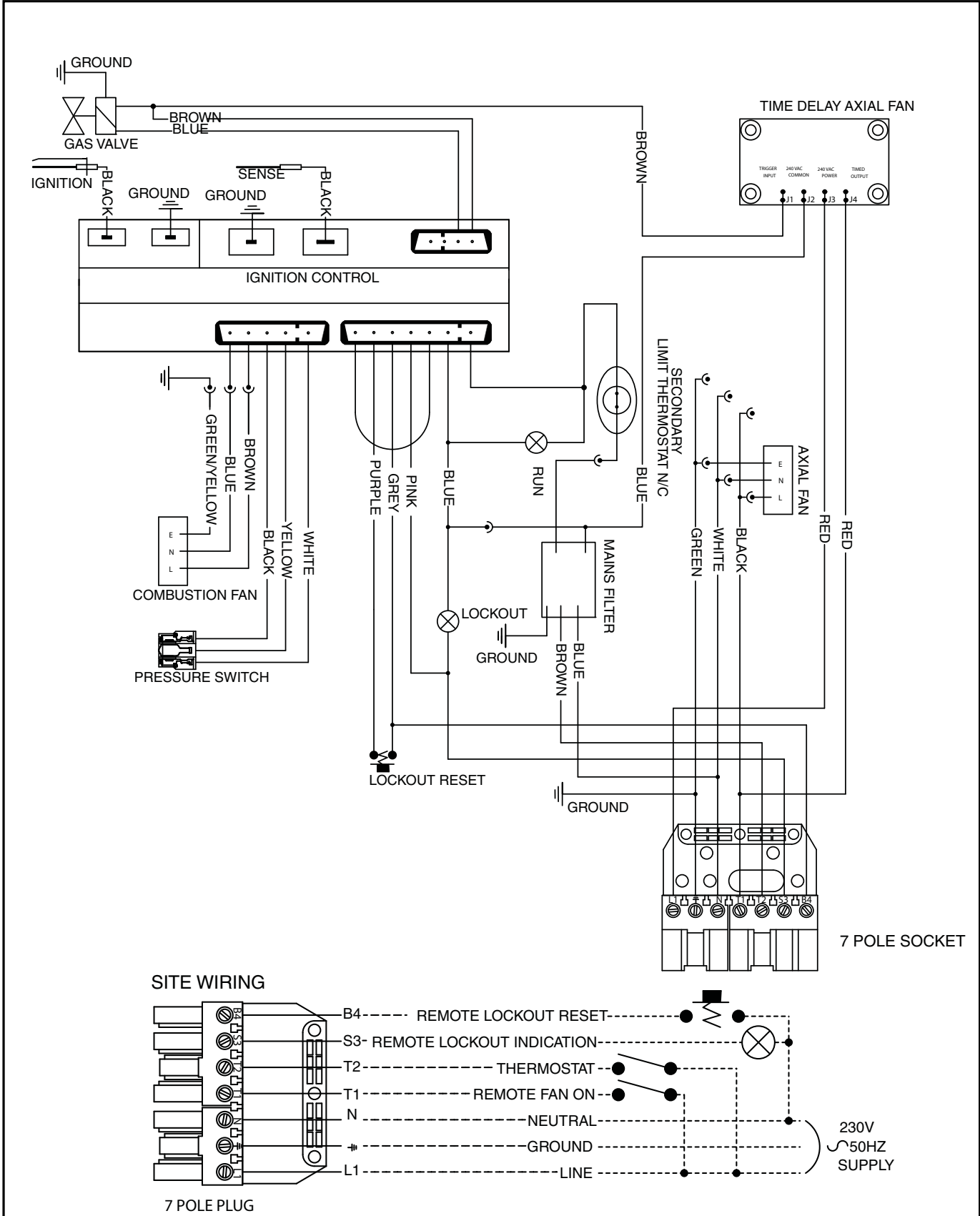
11.2.4 Remote Fan Controls

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

A switch or control wired between terminals T₁ and L₁ (CTU 40 - 60) L & 1 (CTU 75 - 115) 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.

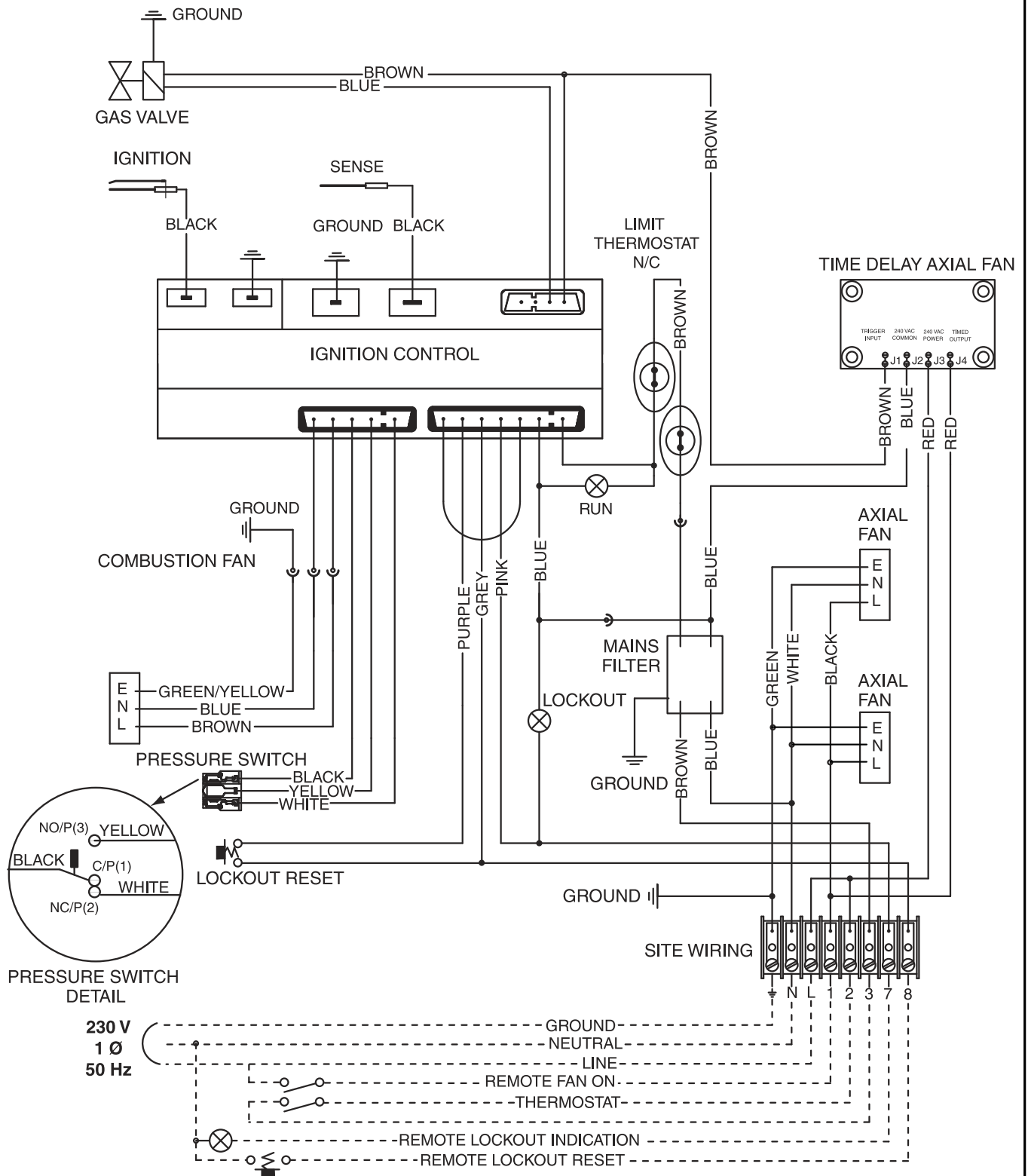
11.3 CTUA Wiring Diagram (Models 40-60)



NOTE:

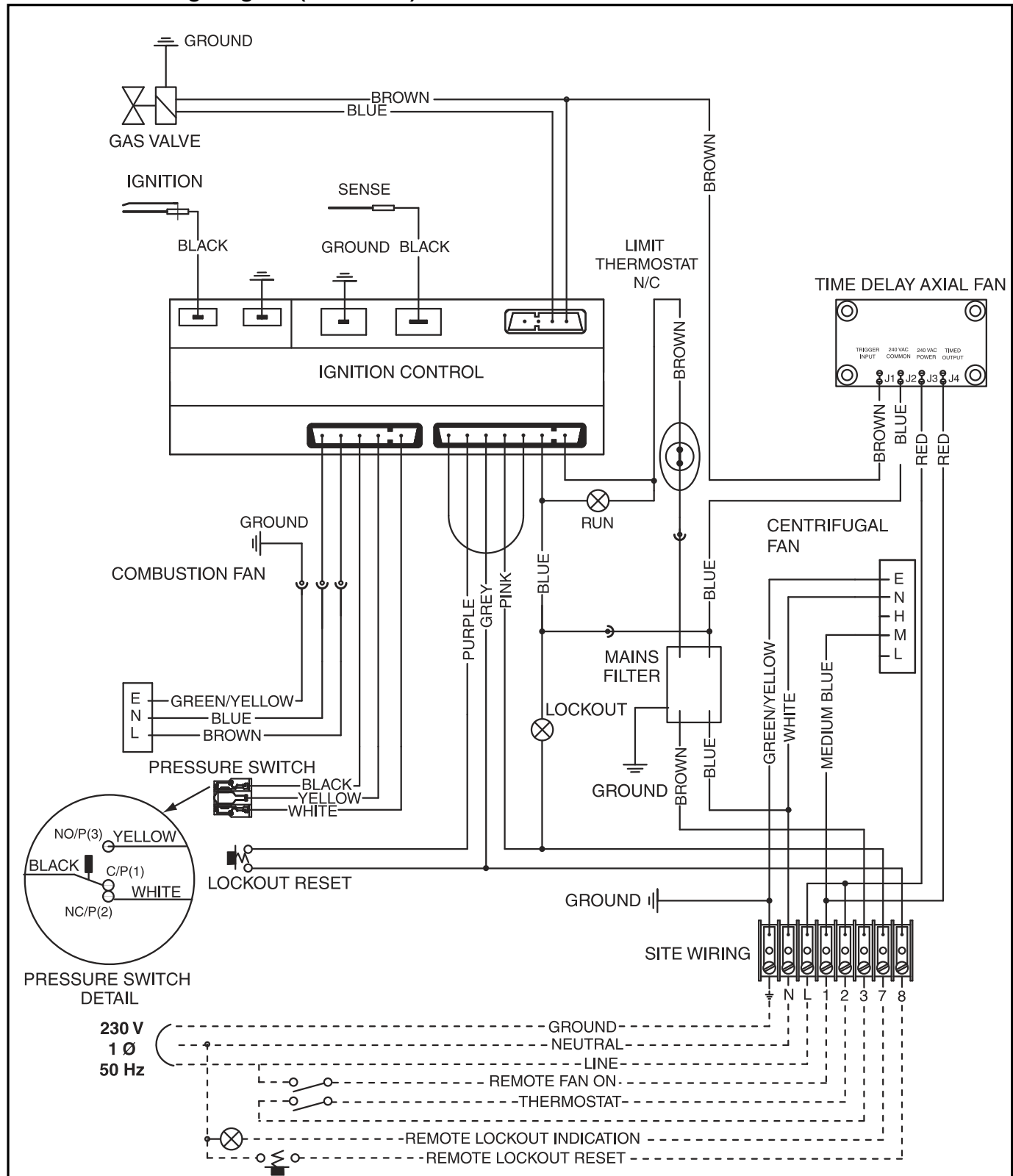
If any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C and 600 volts.

11.4 CTUA Wiring Diagram (Models 75-115)

**NOTE:**

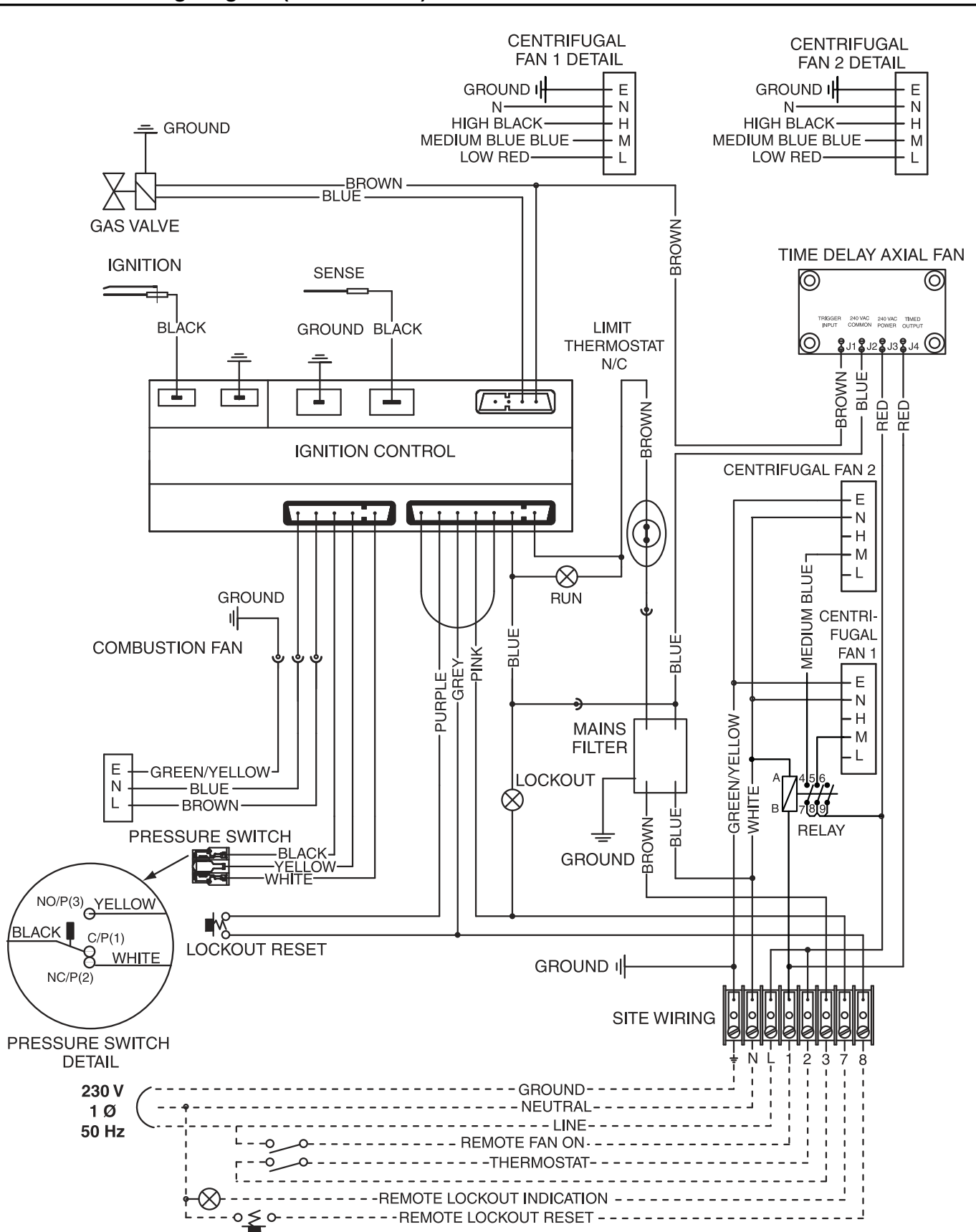
If any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C and 600 volts.

11.5 CTUB/C Wiring Diagram (Models 40)

**NOTE:**

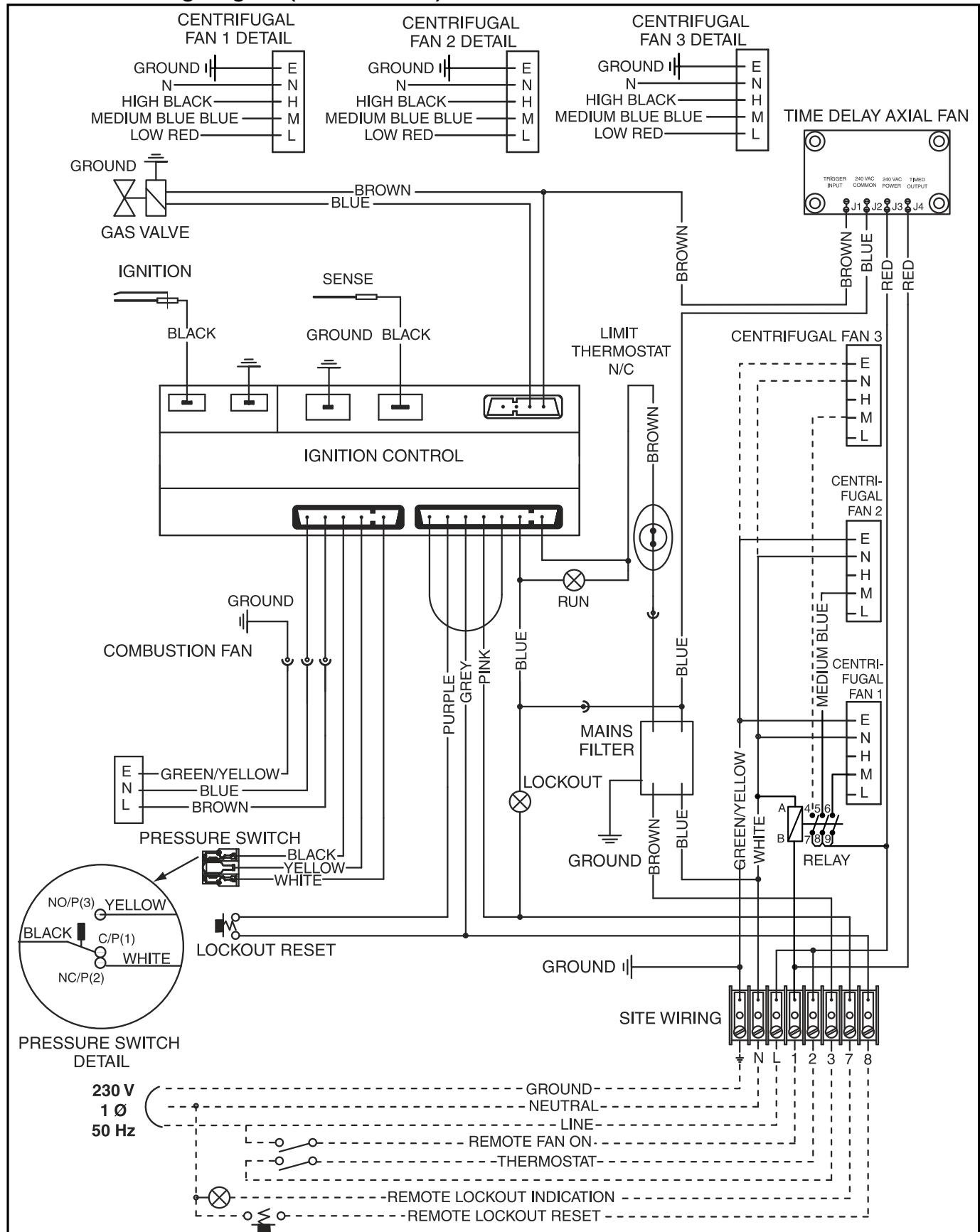
Unused speed setting wires for the centrifugal fan must be isolated and insulated. If any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C and 600 volts.

11.6 CTUB/C Wiring Diagram (Models 50-60)

**NOTE:**

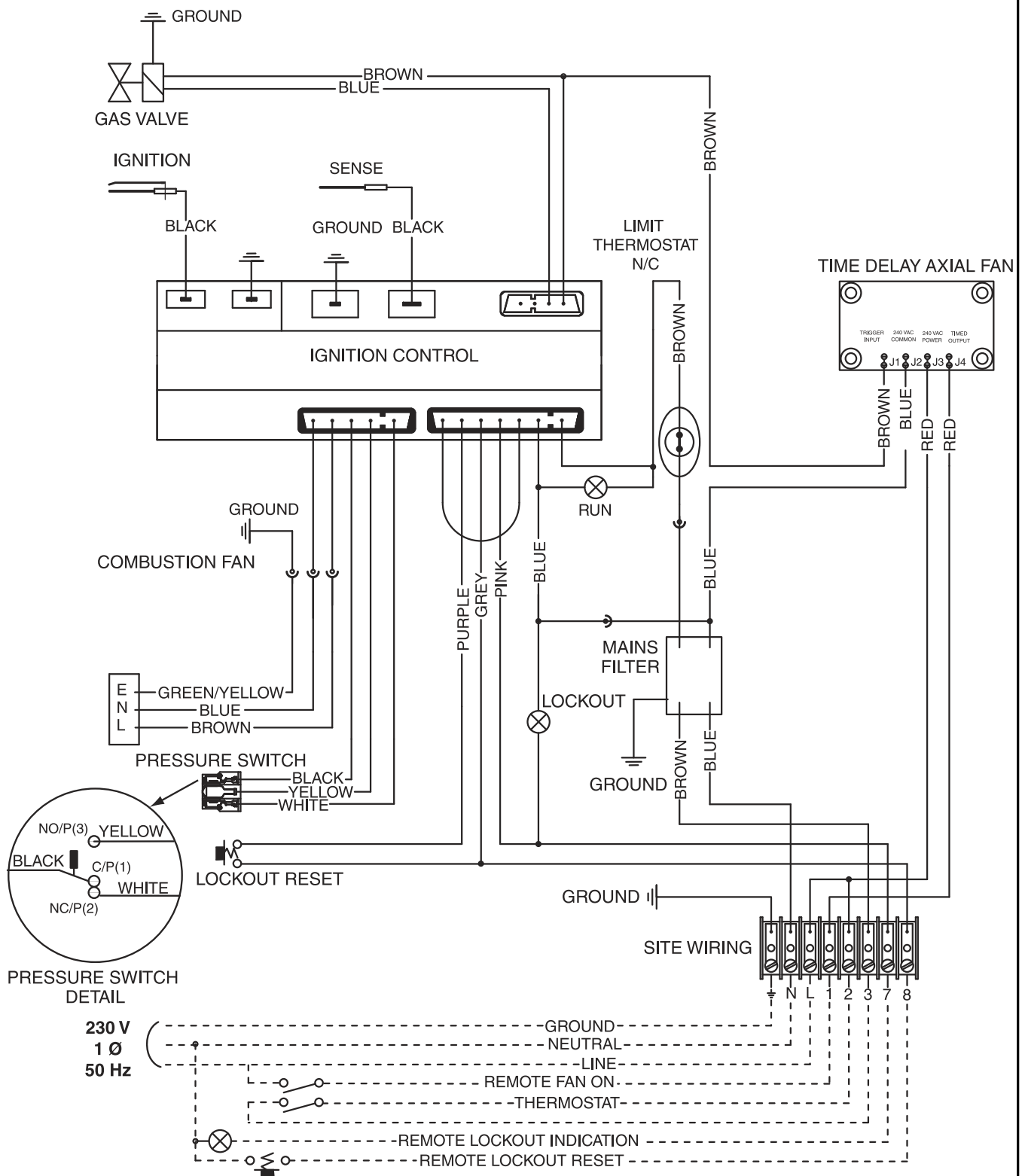
Unused speed setting wires for the centrifugal fan must be isolated and insulated. If any of the original wire supplied with the heater must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C and 600 volts.

11.7 CTUB/C Wiring Diagram (Models 75-115)

**NOTE:**

Unused speed setting wires for the centrifugal fan must be isolated and insulated. 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.

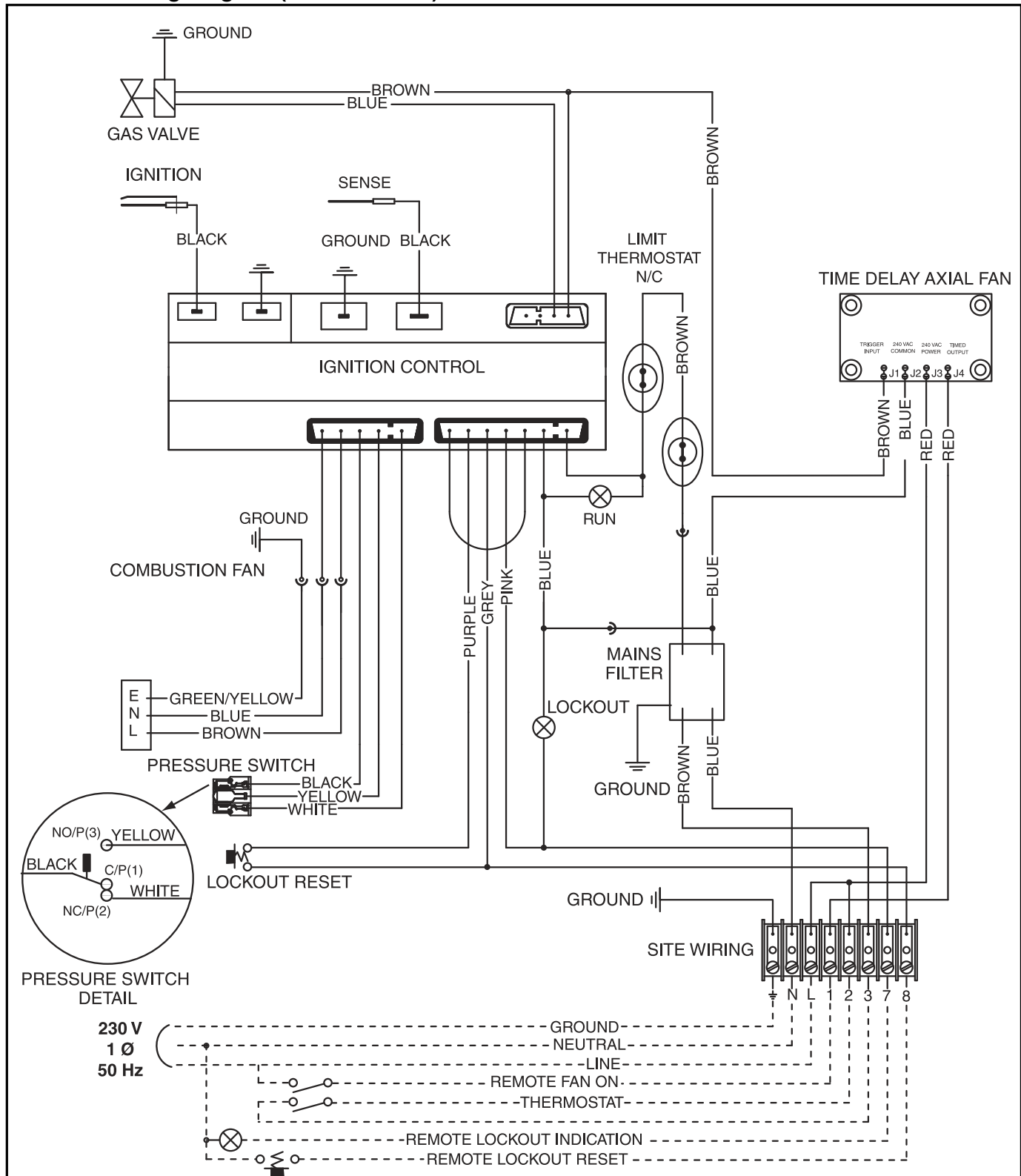
11.8 CTUD Wiring Diagram (Models 40-60)

**NOTE:**

For external fan wiring,
See Page 29, Section 11.10.

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.

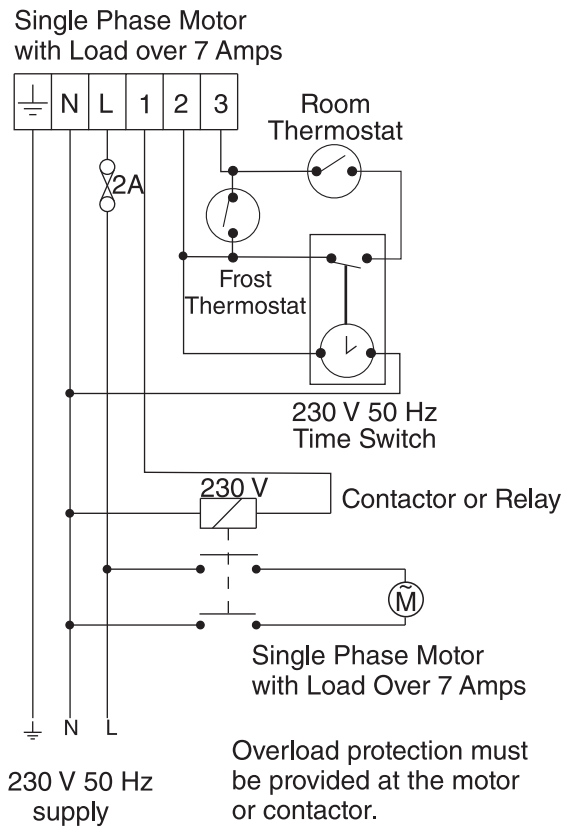
11.9 CTUD Wiring Diagram (Models 75-115)

**NOTE:**

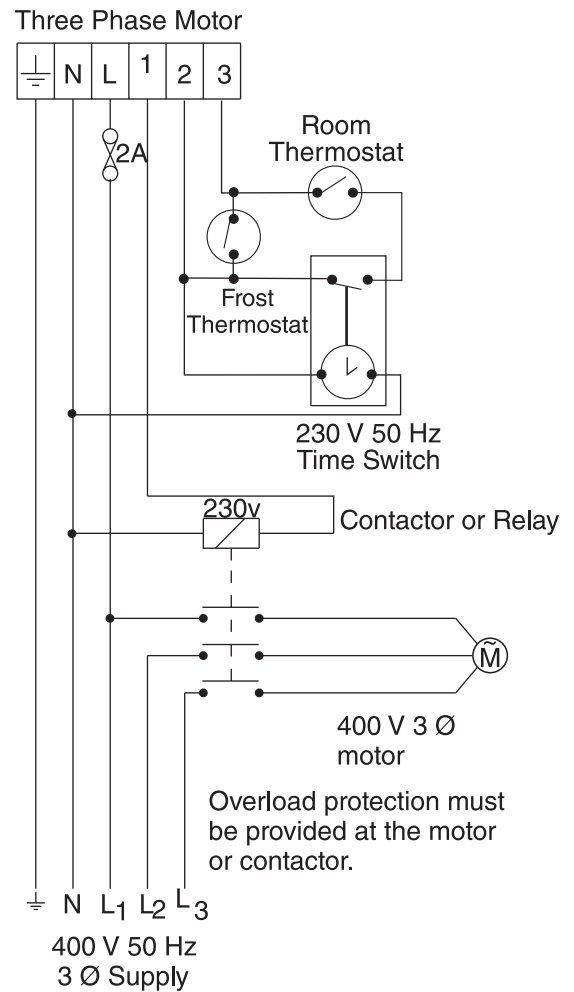
For external fan wiring,
See Page 29, Section 11.10.

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.

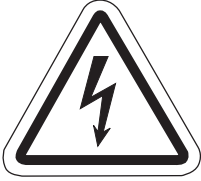
11.10 CTUD External Motor Alternative Wiring & Optional Thermostat/Time Switch



RDW 1565



SECTION 12: COMMISSIONING

⚠ DANGER	⚠ WARNING	⚠ WARNING	⚠ 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 grounded 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.			

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 Europe Limited and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon Europe Limited 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 Europe Limited.

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.

12.1 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.

12.1.1 Louvres

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

12.1.2 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 22, Section 11.3 through Page 29, Section 11.10*.
2. Check the correct fuse size is fitted;
See Page 21, Section 11.1.

12.2 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 regulations.

Ensure that the air is fully purged from the heater inlet pipe up to the main gas valve inlet test nipple.

12.3 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.

12.4 Begin Commissioning

12.4.1 Before Operating the Heater

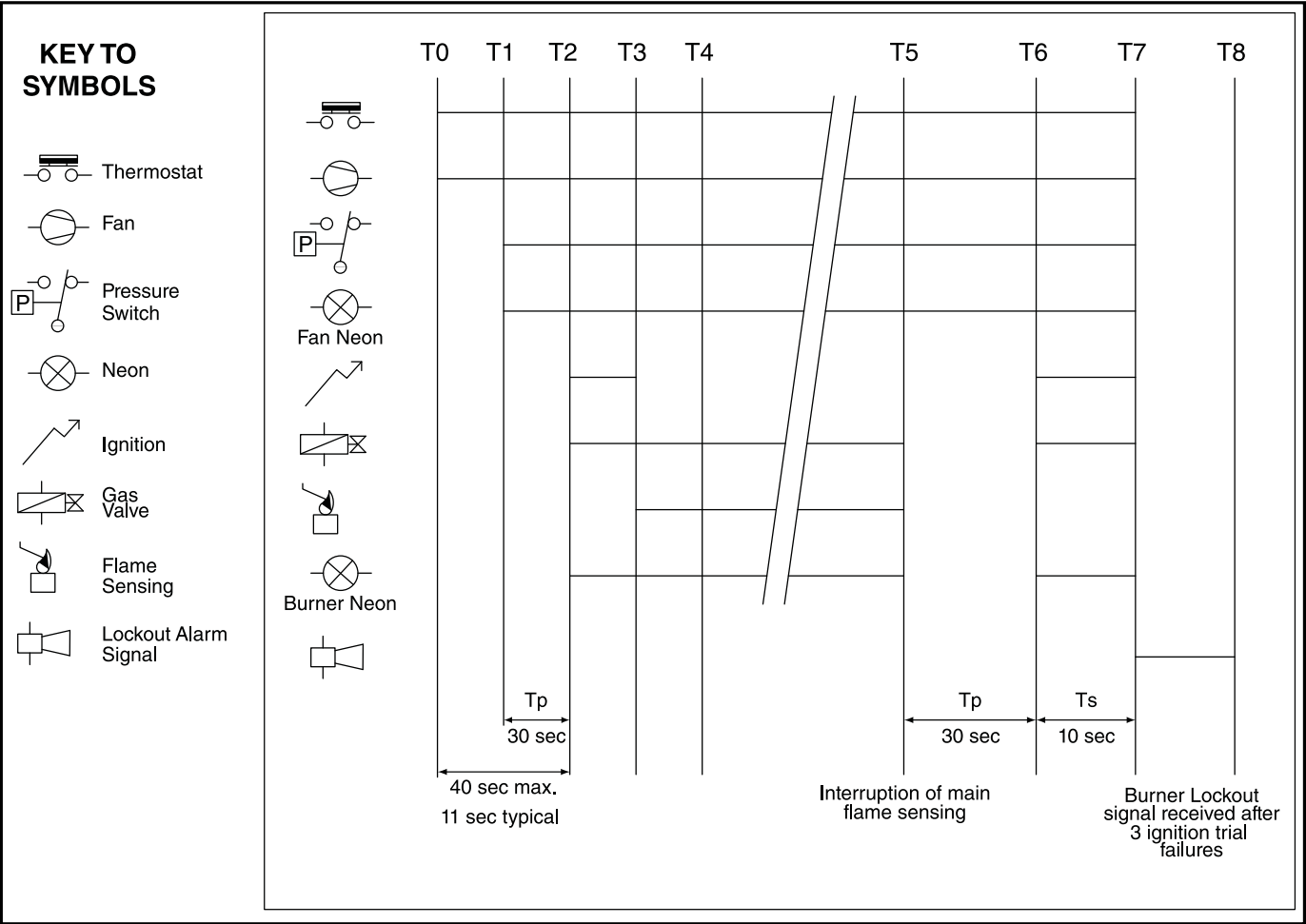
To ensure that all the controls are in safe working order, operate the heater for the first time with the isolating gas valve turned off.

- 1. Turn off the gas isolating valve

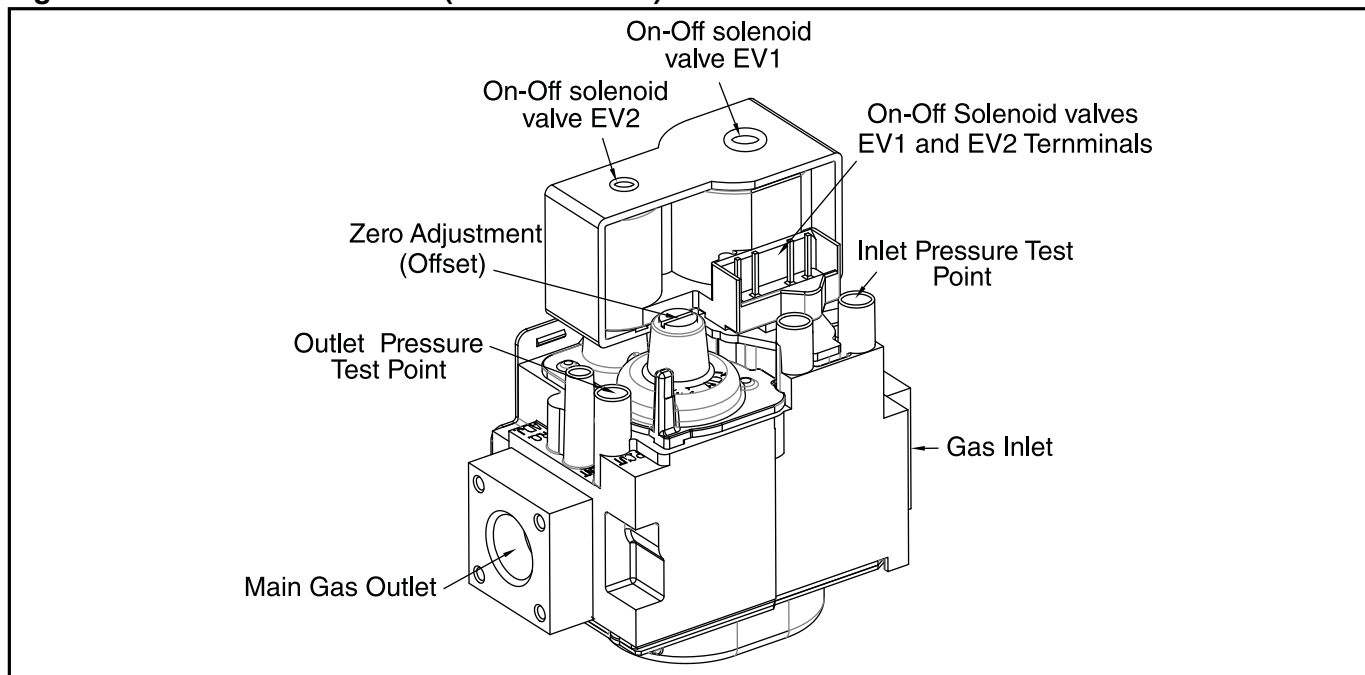
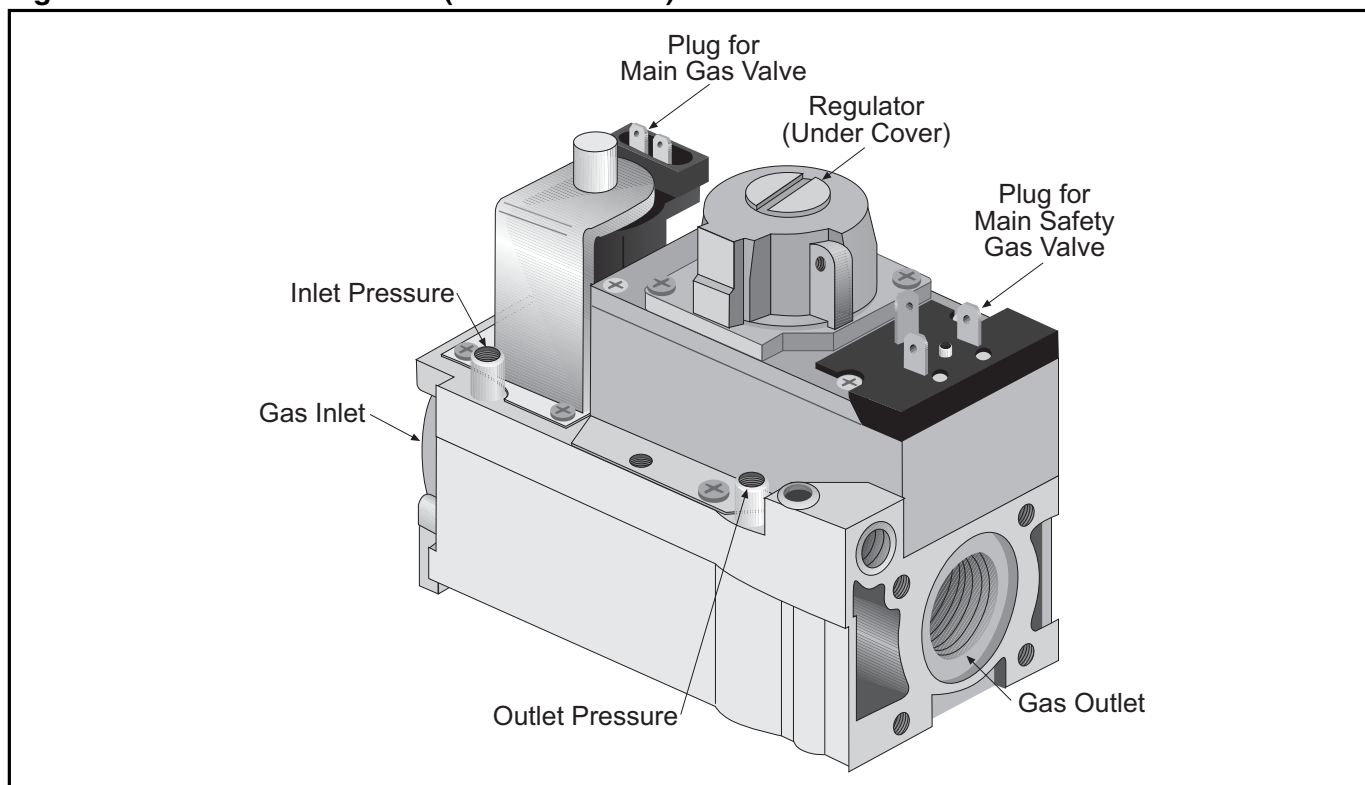
- 2. Using the installed external control, turn on the burner. The automatic sequence will now begin as described on Page 31, Figure 13.

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

Figure 13: 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.

Figure 14: Gas Valve for Heater (Models 40 - 60)**Figure 15: Gas Valve for Heater (Models 75 - 115)****12.4.2 Commissioning the Gas Valves (all gases)****12.4.2.1 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 11, Section 5.4.

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 11, Section 5.4 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.

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 34, Section 13 through Page 35, Section 13.5* and all warnings defined in this manual.

12.5 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 CO₂ should be between 6.5% to 8.0% for natural gas and 7.0% to 9.1% 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 160° C to 180° C. Seal test hole in flue after testing.

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

12.6 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.

12.7 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.

12.8 Complete the Commissioning

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

12.9 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.

SECTION 13: USER INSTRUCTIONS

⚠️ DANGER



Electrical Shock Hazard

Disconnect electric before service.

Heater must be properly grounded.

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

⚠️ WARNING

			
Fire Hazard Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater. Some objects will catch fire or explode when placed close to heater.	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, injury or property damage.

13.1 User Instructions

The CTU 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 35, Section 13.3.2

Thermostat Limit Thermodisc Reset Button:

See Page 35, Section 13.3.1

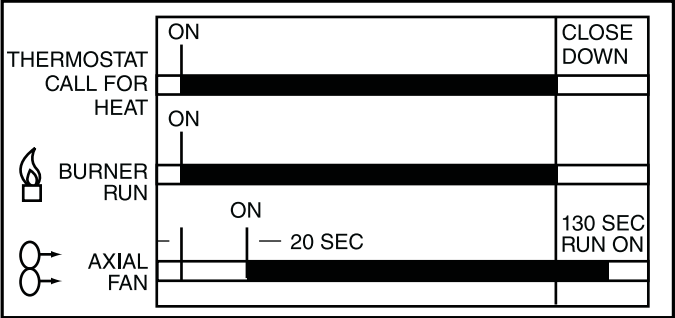
13.2 Heater Operation

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.

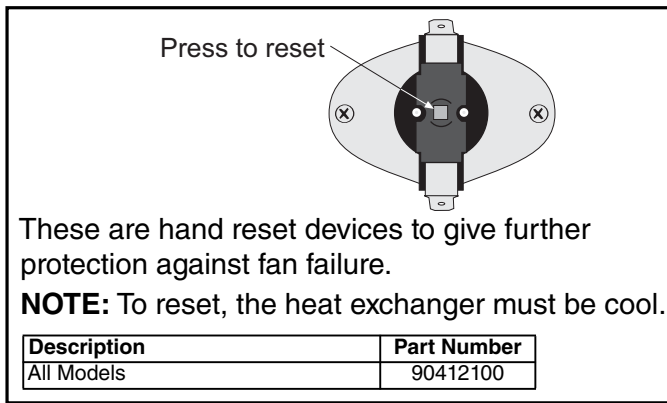
All heaters require a constant gas and electricity supply which must not be interrupted during the normal operation of this heater.

Figure 16: Heater Operating Sequence



13.3 Common User Controls

13.3.1 Thermostat Limit Thermodisc



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

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

13.3.2 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.

13.4 Lighting Instructions

13.4.1 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 green light will be on and the automatic firing sequence will begin as described on *Page 31, Figure 13*. 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 35, Section 13.3.2*.

13.4.2 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".

13.5 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.

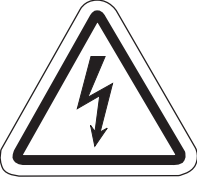
13.5.1 Simple Fault Finding (Burner Faults)

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 hold the lockout reset button for five seconds. 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 14: SERVICING

⚠ 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 grounded 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.			

⚠ WARNING



Severe Injury Hazard

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.

14.1 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.

NOTE 1: After any maintenance or repair work always test fire the heater in accordance with the commissioning instructions on Page 30, Section 12 through Page 33, Section 12.9 to 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 40, Section 16 through Page 43, Section 16.4.

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.

14.2 Burner Maintenance

1. Open the hinged door and remove the burner compartment cover. See Page 47, Section 17.2.
2. Clean any deposits from the main burner which may have formed in the injectors or venturi of the burner. See Page 47, Section 17.2.
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.

14.3 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.

14.3.1 For CTUB & CTUC Centrifugal Fan Models

CTUB and CTUC models are fitted with thermally protected three speed fans. The number of fans can be found on Page 53, Section 17.9 and the standard air flow for each model can be found on Page 10,

Section 5.3.

For CTUC models, the fans may be accessed via the removable panels in the top, bottom and sides of the inlet spigot compartment as required.

Do not operate at higher speeds than the original setting on the heater without prior consultation with Roberts-Gordon Europe Limited.

The "HIGH" speed option is available to give the normal required air flow against higher static pressures and is not intended to be operated free blowing or against low resistance. Use of the fans under these conditions may cause the fan thermal overload to operate and the fan thermostat to cycle.

All fans on a heater must be set to operate at the same speed. For Models 50 - 115, they will be switched using a fan relay built into the heater. See *Page 52, Section 17.8.2.*

14.4 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.

14.5 Gas Control Valve Maintenance

No regular maintenance is required on these devices. To change gas control valves, See *Page 45, Step 17.1 and Page 51, Section 17.5.*

Do not repair or disassemble on site.

Replace faulty gas valves with genuine replacement parts sold and supplied by Roberts-Gordon Europe Limited.

14.6 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 50, Section 17.4*). Ensure that the fan is free to run and that the fan wheel is clean.

14.7 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 of equipment sold and supplied by Roberts-Gordon Europe Limited and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment.

To help facilitate optimum performance and safety, Roberts-Gordon Europe Limited 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 Europe Limited.

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 <i>Page 5 and Page 6, Section 3.</i>
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 <i>Page 15, Section 7 through Page 17, Section 8.</i>
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.

Heat Exchanger	Make sure there are no cracks. Make sure there is no sagging, bending or distortion. Clean or replace as required.
Gas Line and Shut-off Valves	Check for gas leaks. <i>See Page 19, Section 10.</i>
Burner Observation Window	Make sure it is clean and free of cracks or holes. Clean and replace as required.
Flue Blower Scroll, Wheel and Motor	Compressed air or a vacuum cleaner may be used to clean dust and dirt.
Inshot Burners and Orifices	Clear obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.
Direct-Spark Igniter	Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode. The electrode gap should be 1/8" (3.2 mm).
Thermostat	There should be no exposed wire or damage to the device or wiring. <i>See Page 21, Section 11.</i>
Suspension Points	Make sure the heater is hanging securely. Look for signs of wear on the suspension materials or ceiling. <i>See Page 12, Section 6.</i>
Silicone Tubing	Ensure tight, secure fit on all pressure fittings at pressure switch, burner partition, and blower outlet.
Gas Valve	Verify that cap covering pressure regulator adjustment screw is secure and has not been tampered with. Verify all wiring connections.
Condensate Drain (when installed)	Flush drain and clear any obstructions.
Ductwork	Consult an indoor air quality professional for proper cleaning procedures
Air Circulation Blower	For a complete inspection, refer the manufacturers Installation, Operation and Service manual.
Wall Tag	If wall tag is present, make sure it is legible and accurate. Please contact Roberts-Gordon Europe Limited or your ROBERTS GORDON® independent distributor if you need a wall tag. <i>See Page 4, Section 2.1.</i>
Safety Labels	Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon Europe Limited of your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. <i>See Page 2, Figure 1 through Page 3, Figure 2.</i>

SECTION 15: CONVERSION BETWEEN GASES

15.1 General

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

15.2 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 47, Section 17.2*.
2. Remove the connection between the gas valve outlet and the manifold. *See Page 45, Section 17.1* for gas valve removal.
3. Remove the manifold from the burner assembly by removing the screws at the top and bottom. *See Page 47, Section 17.2.1*.
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.

15.3 Gas Valves

All gas valves used on the CTU 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 11, Section 5.4*.

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 16: TROUBLESHOOTING

⚠️ DANGER



Electrical Shock Hazard

Disconnect electric before service.

Heater must be properly grounded.

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

⚠️ WARNING



Fire Hazard

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

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



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

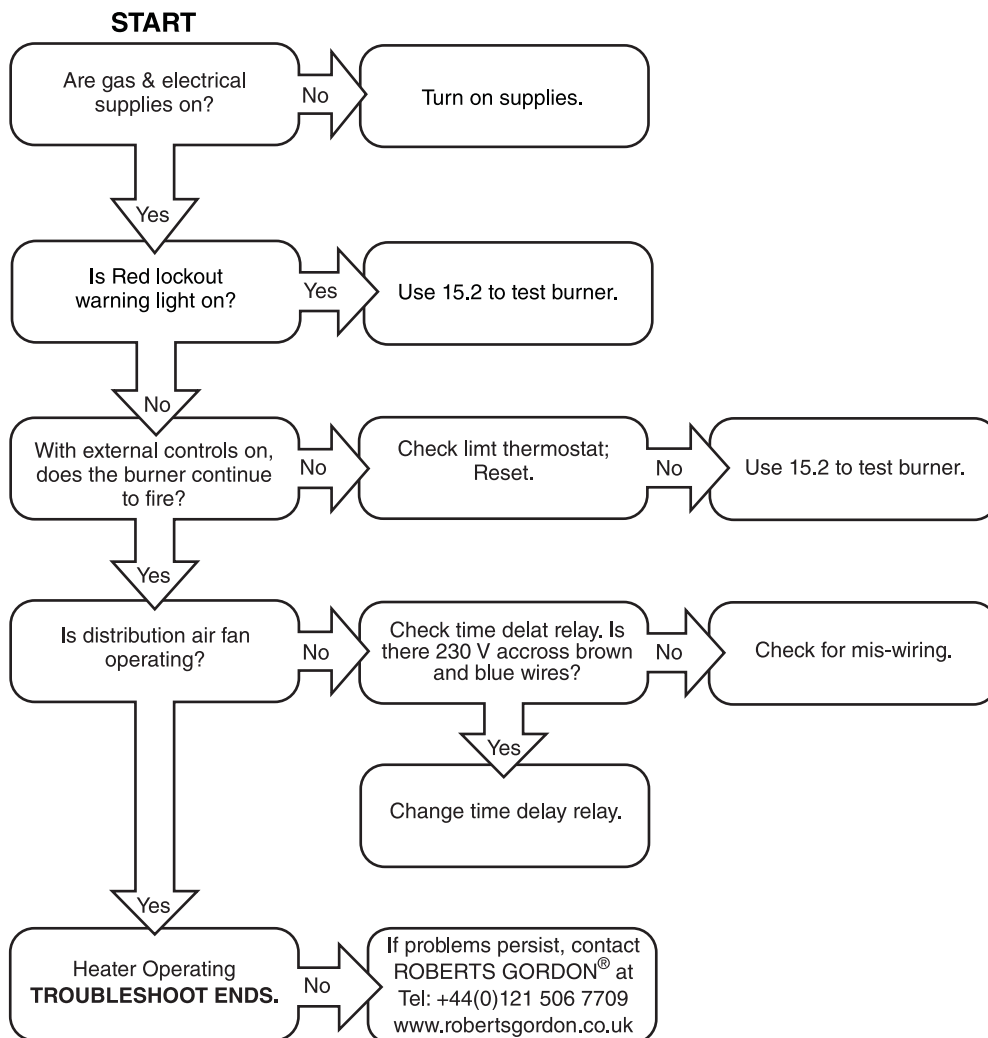
Wear protective gear during installation, operation and service.

Edges are sharp.

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

40 of 53

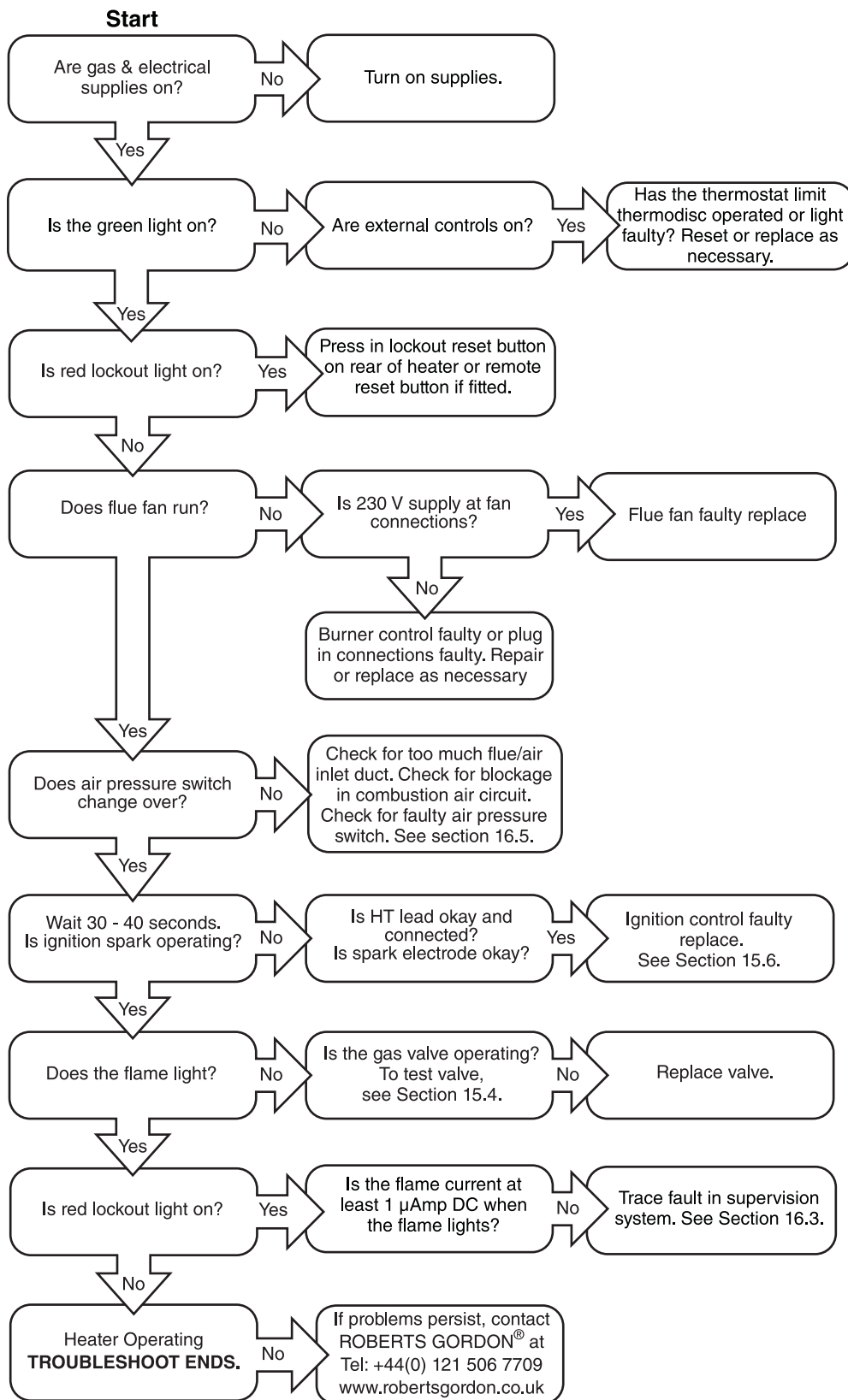
16.1 General



Conduct Commissioning procedure as shown on *Page 30, Section 12.*

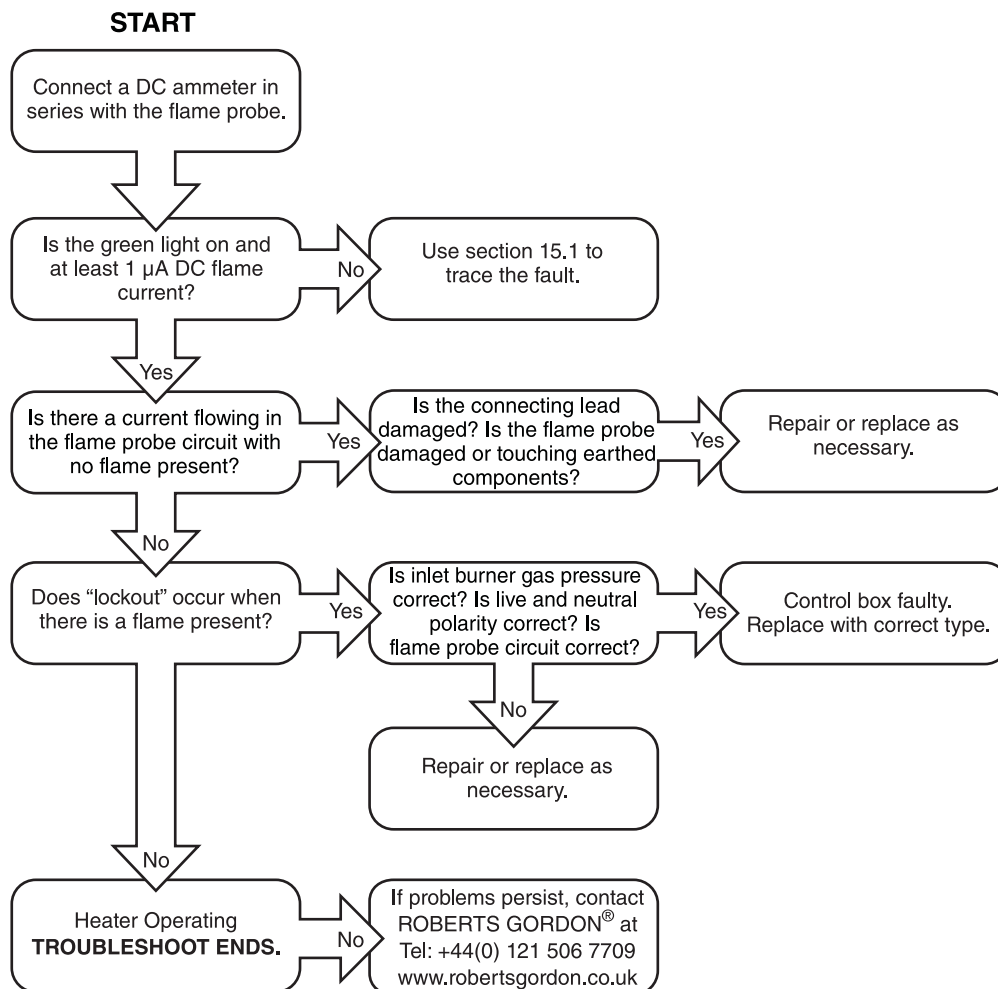
16.2 Troubleshooting For Automatic Ignition Burner Systems

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



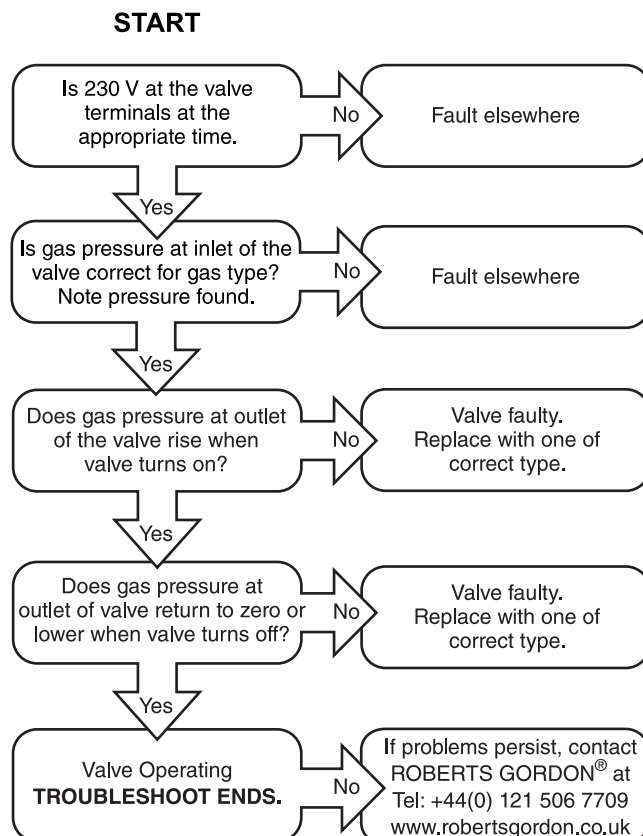
Conduct Commissioning procedure as shown on Page 30, Section 12.

16.3 Troubleshooting for Flame Supervision System

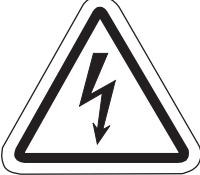


NOTE: Minimum flame probe current 1 µA DC.

16.4 Troubleshooting for Solenoid Valves



SECTION 17: REMOVAL AND REPLACEMENT PARTS

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

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 commissioning instructions on *Page 30, Section 12* 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 40, Section 16 through Page 43, Section 16.4*.

Burner Components

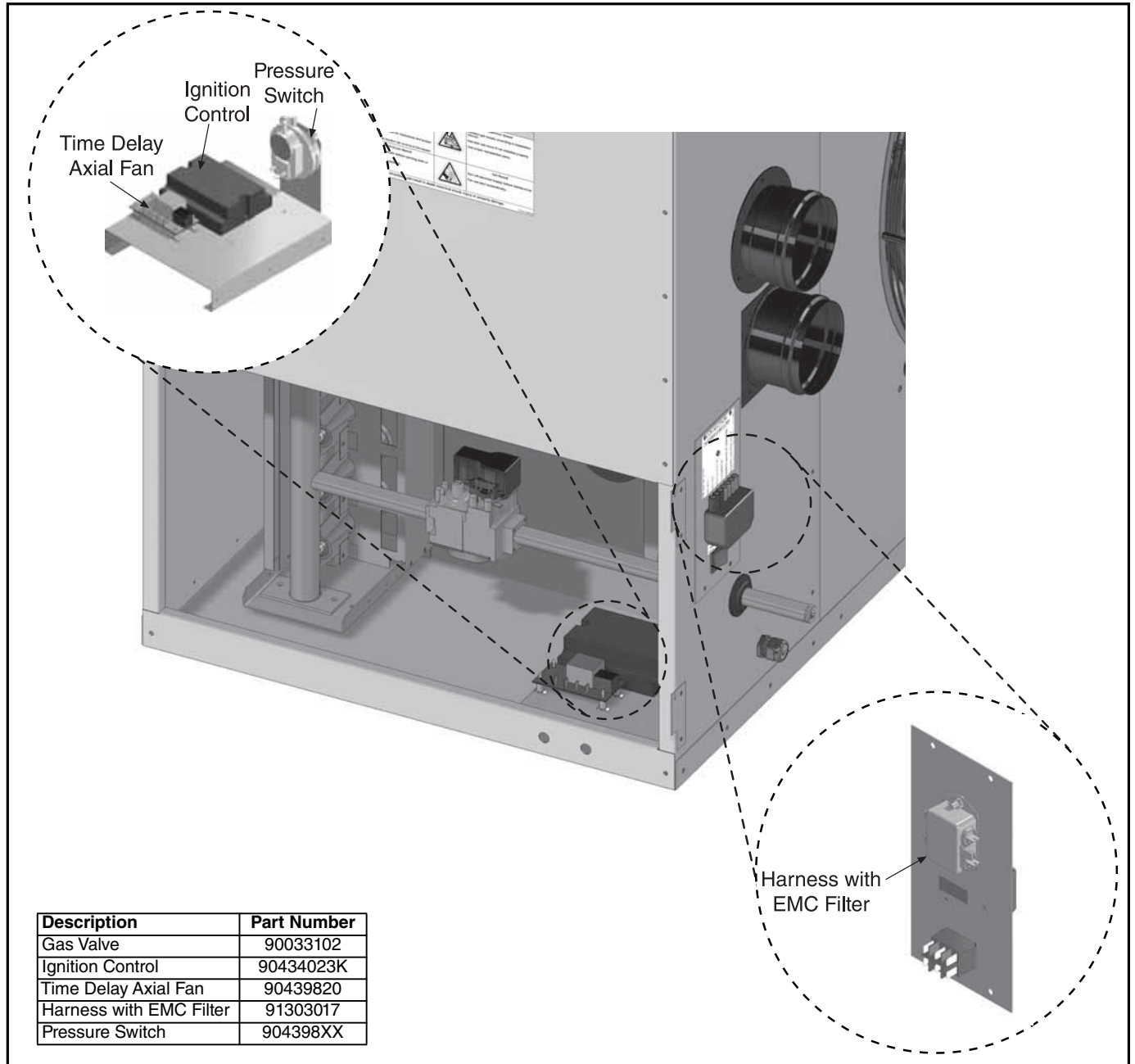
All serviceable burner parts are accessed by the door on the right side of the heater. Use a screwdriver to turn the latch 90°. See *Page 8, Section 5*.
The entire heater enclosure containing the burners and gas controls is a sealed compartment. Ensure proper sealing and replace gaskets as needed.

Description	Part Number
Door Gasket	92700022
Filler Panel	R056A

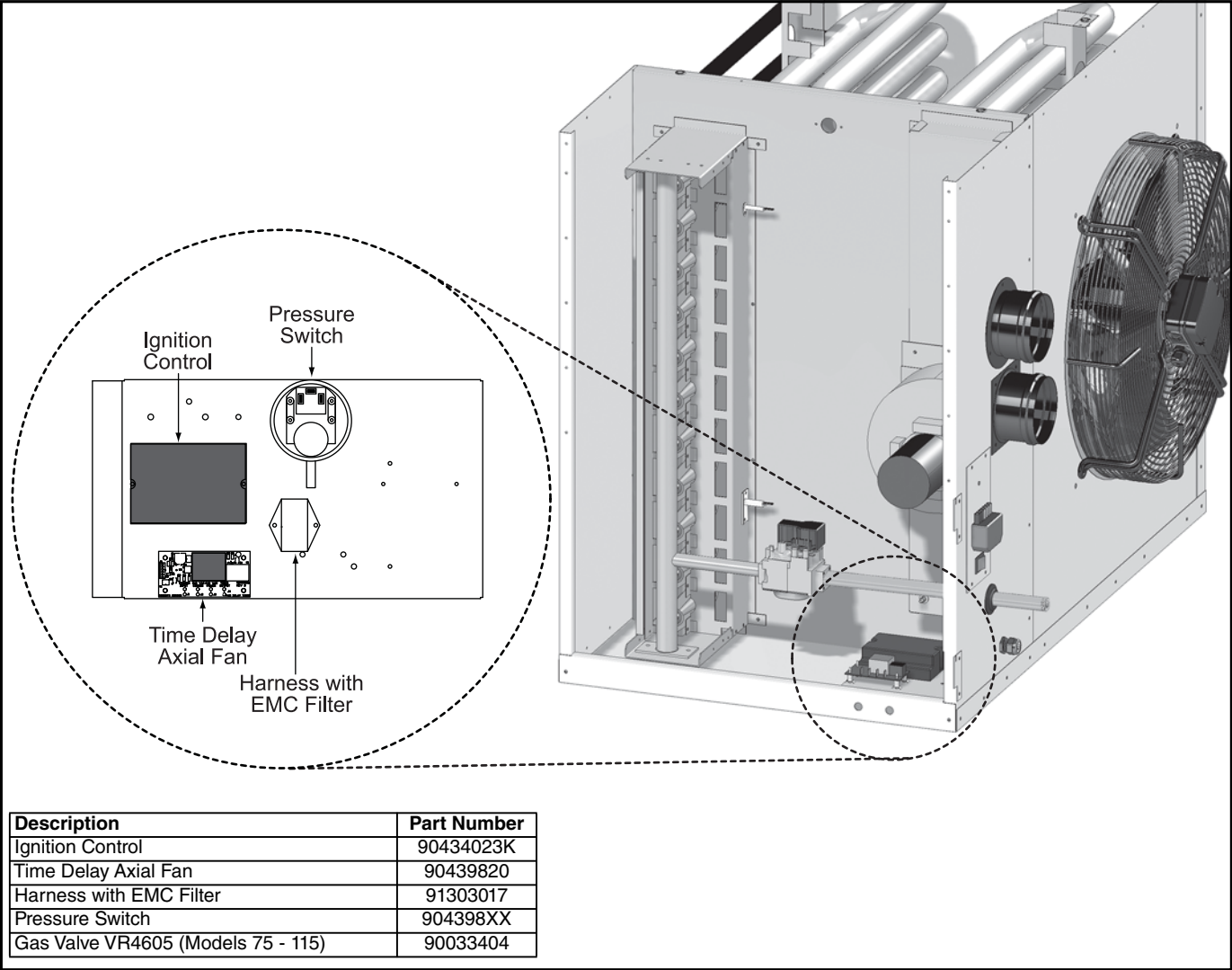
17.1 Gas Valve

Remove the gas supply pipe at the heater inlet.

17.1.1 Models 40 - 60



17.1.2 Models 75 - 115



17.1.3 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 32, Section 12.4.2.*

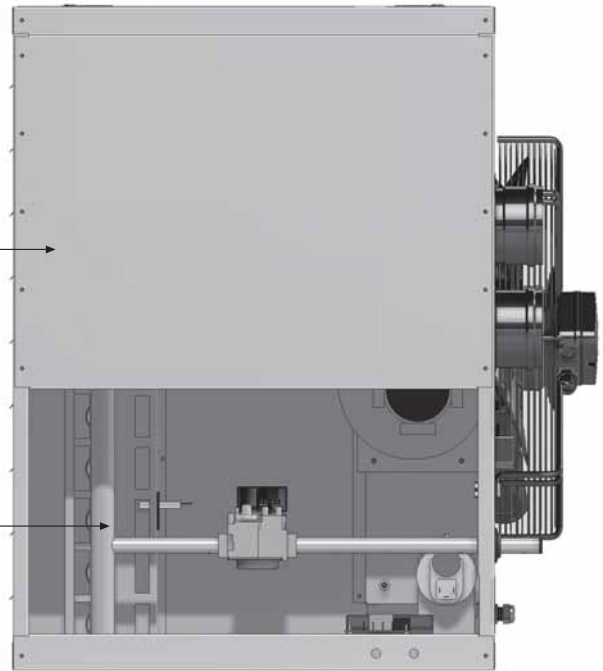
IT IS IMPORTANT THAT ONLY THE CORRECT GAS VALVES SPECIFIED FOR EACH MODEL TYPE ARE USED WHEN REPLACING THESE CONTROLS.

17.2 Burner Compartment

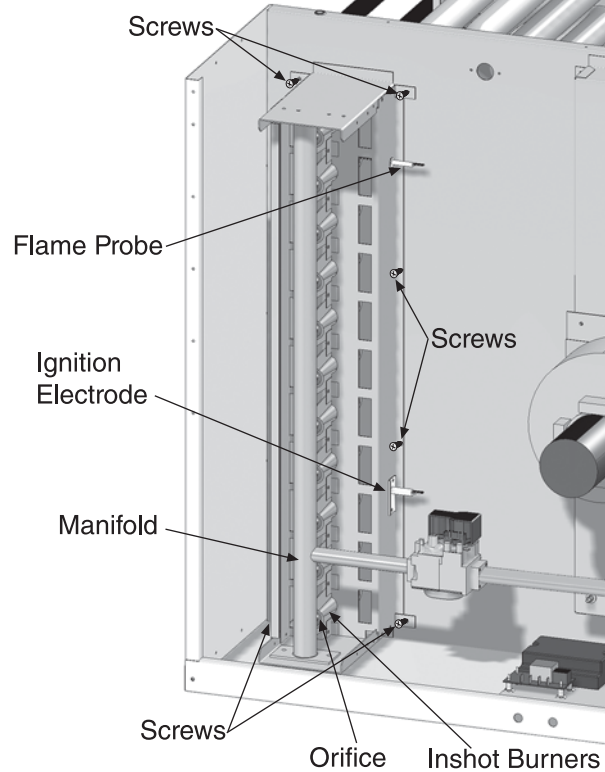
Before burner removal, remove the 10 screws holding the filler panel on and remove the filler panel.

Filler
Panel

Burner
Assembly



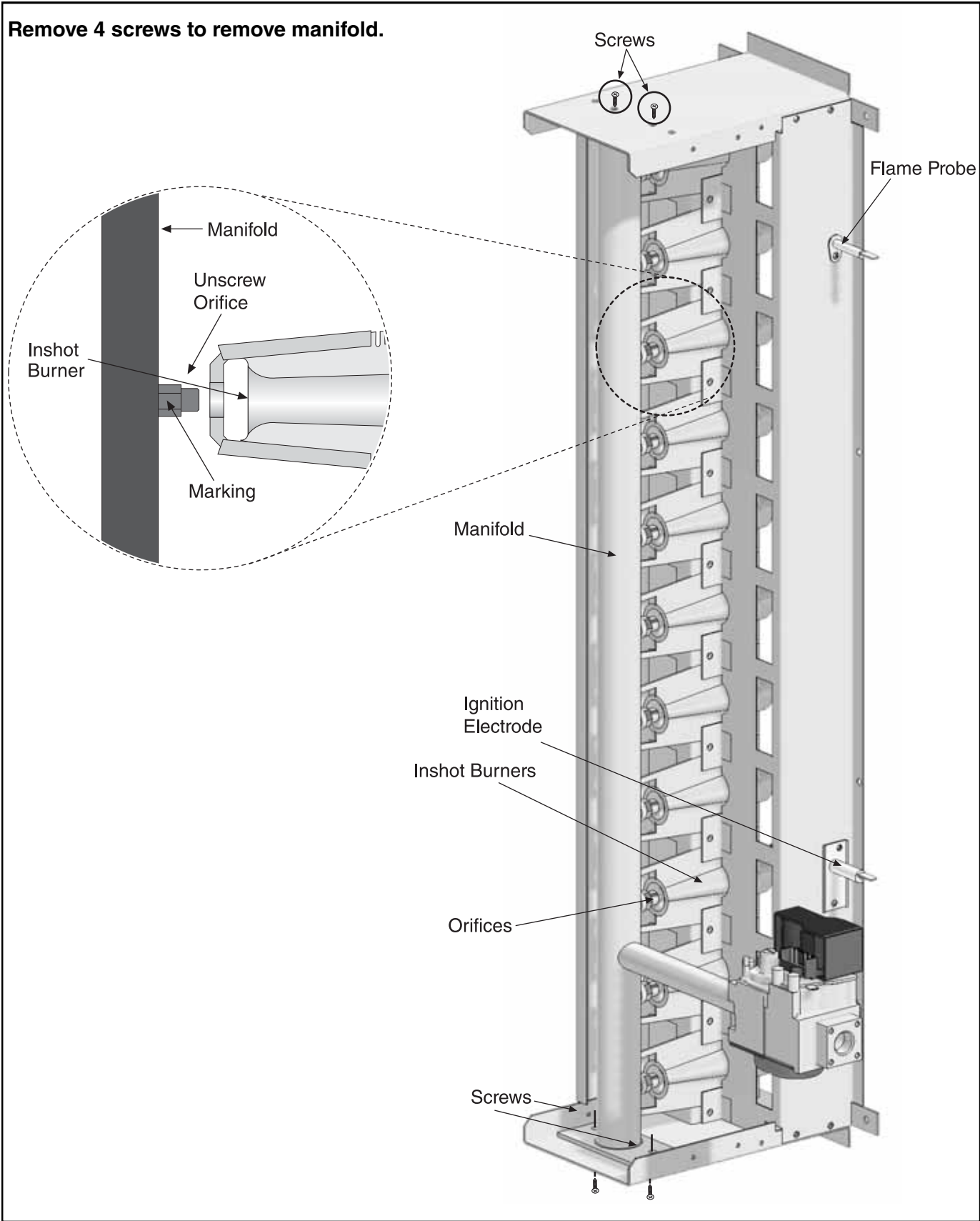
17.2.1 Burner Compartment without Filler Panel



Note: Burner assembly must be removed to service injectors, manifold or burners.

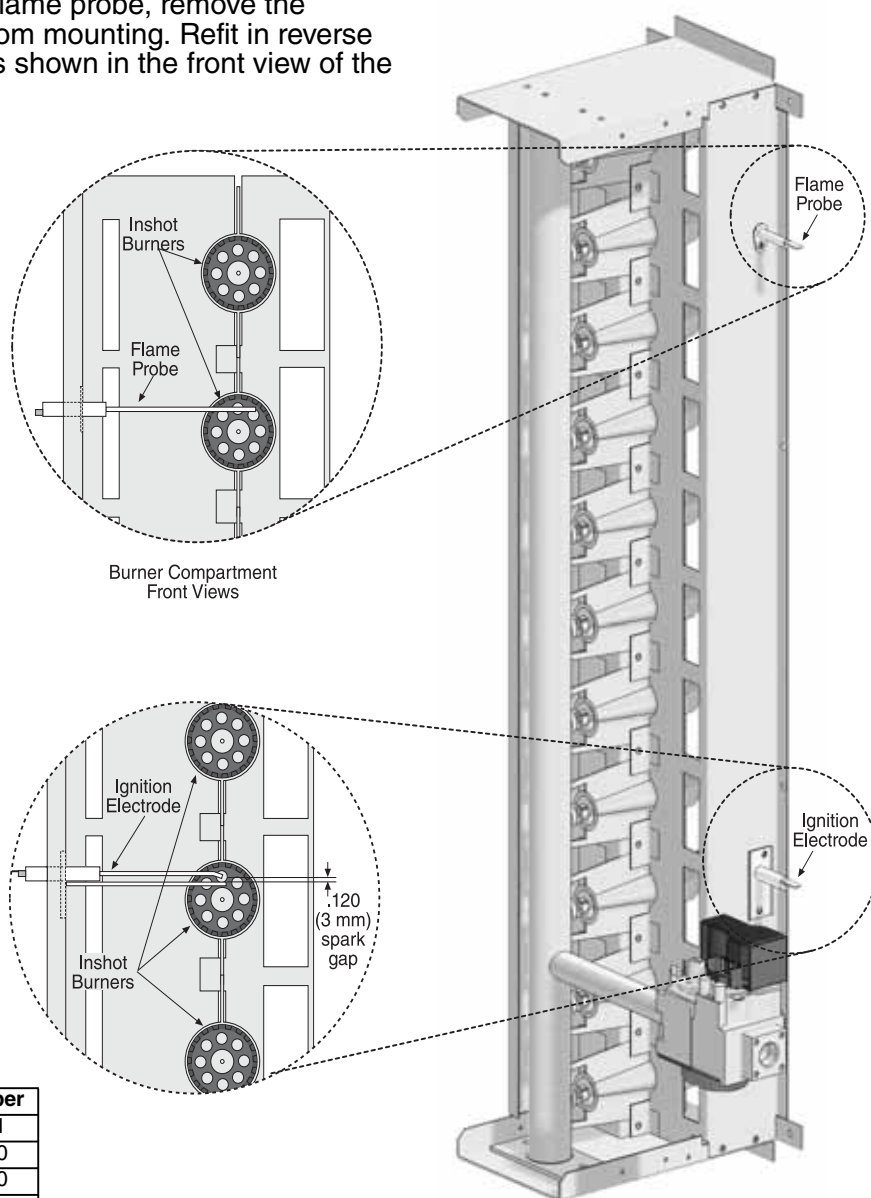
17.2.2 Burner Assembly

Remove 4 screws to remove manifold.



17.3 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 (all models except CTU-40)	92000000
Burners - CTU-40	92000001

MODEL	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
Injector Quantity	7	9	11	12	14	15	17
Natural Gas (G20)							
RG P/N	91930225	91930043	91930043	91930036	91930036	91930036	91930036
Marking	225	#43	#43	#36	#36	#36	#36
Injector size mm Ø	2.25	2.261	2.261	2.71	2.71	2.71	2.71
Injector size in Ø	0.0886	0.089	0.089	0.1067	0.1067	0.1067	0.1067
Natural Gas (G25)							
RG P/N	91930225	91930036	91930036	91930036	91930036	91930036	91930036
Marking	225	#36	#36	#36	#36	#36	#36
Injector size mm Ø	2.25	2.261	2.261	2.71	2.71	2.71	2.71
Injector size in Ø	0.0886	0.089	0.089	0.1067	0.1067	0.1067	0.1067
LPG Gas Propane (G31) and LPG Gas Butane (G30)							
RG P/N	91930054	91930054	91930225	91930053	91930053	91930053	91930053
Marking	#54	#54	2.25	#53	#53	#53	#53
Injector size mm Ø	1.40	1.40	2.25	1.51	1.51	1.51	1.51
Injector size in Ø	0.0551	0.0551	0.0886	0.0594	0.0594	0.0594	0.0594

17.4 Flue Fan

Remove screws securing outlet flange to the flue adapter.

Remove screws securing flue fan mounting plate to vent box. Remove screws securing mounting plate to fan. Refit in reverse. Use new gaskets. Ensure sealed joints. Ensure mounting plate orifice is clear and not obstructed.

MODEL	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
Flue Fan	Torin DSA 508-128 077272	Torin DSA 524-202 077273	Torin DSA 524-202 077273	AO Smith JFIG098NS	AO Smith JFIG098NS	AO Smith JFIG098NS	Torin DSF 146-052 077274
RG P/N	90710430	90710440	90710440	90710001	90710001	90710001	90710450
Air mm Ø Plate in Ø	69.1 2.72	69.9 2.75	76.2 3.0	85.0 3.35	103.6 4.08	110.5 4.35	152.4 6
RG P/N	11011137	11011136	11011135	11011134	11011133	11011132	11011131

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 34, Section 13.*

17.5 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 30, Section 12*.

Pressure Switch	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
RG P/N	90439803	90439821	90439810	90439811	90439807	90439811	90439807
Colour Code	grey	brown	black	grey	brown	grey	brown
Set Point mbar	1.02	.95	0.87	1.79	1.69	1.79	1.69
in wc	0.41	0.38	0.35	0.72	0.68	0.72	0.68

17.6 Ignition Control

IT IS IMPORTANT THAT ONLY THE CORRECT IGNITION CONTROL SPECIFIED FOR EACH MODEL TYPE IS USED WHEN REPLACING THESE ITEMS.

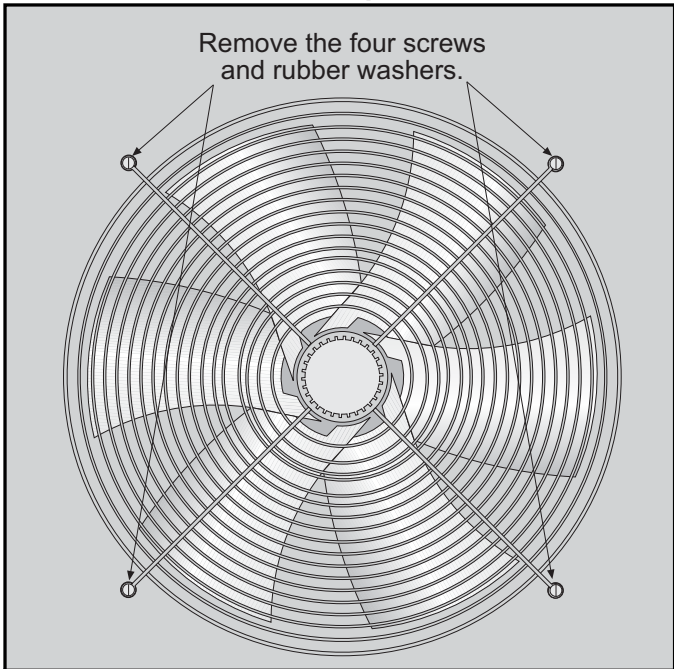
17.6.1 Models 40 to 115

This control is mounted at the electrical mounting plate. Pull out the 3 cable connectors. Pull out ignition cable, ignition earth and flame probe cable noting their positions. Remove the screws. Refit in reverse. Ensure correct location of ignition and flame probe cables.

17.7 CTUA Axial Fan/Guard/Motor Assembly

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

17.7.1 Fan Removal and Replacement



Remove the four screws and rubber washers.

Description	Part Number
Axial Fan 16 in. (Models 40, 75, 90)	90750002
Axial Fan EBM (Models 50, 60,100, 115)	90750001

17.7.2 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.

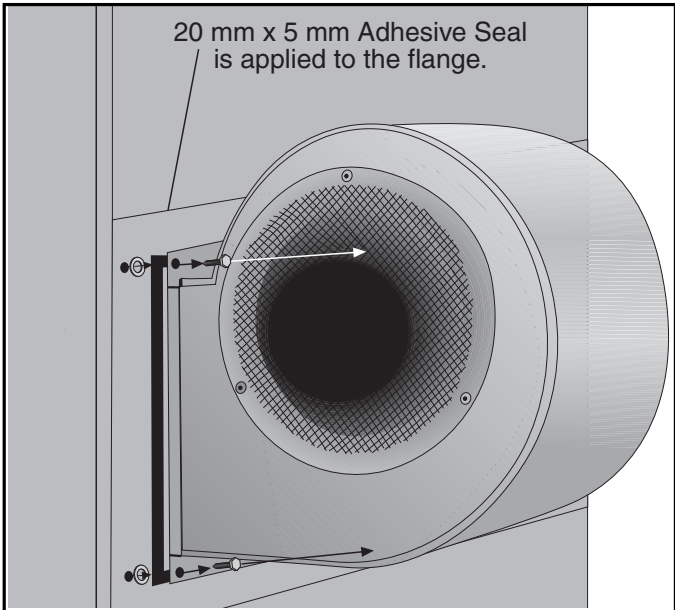
- Check that the fan blades are free to rotate before turning on the power to the fan.
- Strictly comply with the colour code of the fan wires to ensure correct operation. See Page 22, Section 11.3 through Page 23, Section 11.4 wiring diagrams
- Use only genuine replacement parts sold and supplied by Roberts-Gordon Europe Limited.

17.8 CTUB & CTUC Centrifugal Fan/Guard/Motor Assembly

The direct drive fan/s for the CTUB & CTUC range is supplied as a complete assembly. Take careful note of the electrical connections of the fan before disconnecting from the terminals.

For the CTUC versions fitted with an inlet spigot assembly, the fans may be accessed through the removable covers on the sides, top and bottom of the spigot, as required.

17.8.1 Fan Removal and Replacement



20 mm x 5 mm Adhesive Seal is applied to the flange.

Description	Part Number
Torin Fan DDC 270-270	A047
Torin Fan DDC 241-241	A049

Remove the fan by removing the fixing screws while supporting the weight of the fan (approx. 19 kg).

17.8.2 To Replace the Fan(s)

To reassemble, reverse the procedure shown above.

- Fit new rubber seal between the fan flange and the heater rear panel.
- Fit to the rear panel in the correct orientation as shown on Page 53, Figure 17.
- Strictly comply with the colour code of the fan wires to ensure correct operation. See Page 24, Section 11.5 through Page 26, Section 11.7 wiring diagrams.
- Use only genuine replacement parts sold and supplied by Roberts-Gordon Europe Limited.

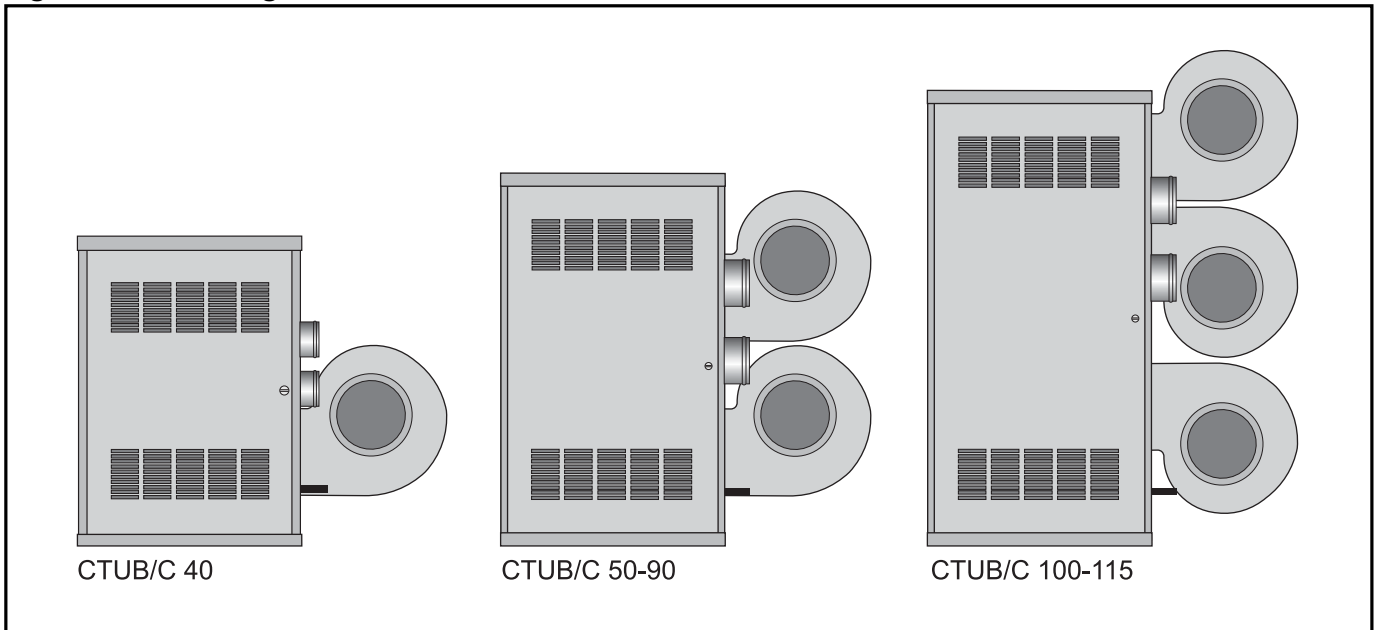
The three speed winding connections are:

Low speed: White N, Red Live The other two windings are "parked" separately in spare terminals.

Medium speed: White N, Blue live. The other two windings are "parked" separately in spare terminals.

High speed: White N, Black live. The other two windings are "parked" separately in spare terminals.

- Check that the fan blades are free to rotate without catching before turning on the power to the fan.
- Set all fans to operate at the same speed.

Figure 17: Centrifugal Fan Orientation**17.9 Fan Data**

MODEL	CTU-40	CTU-50	CTU-60	CTU-75	CTU-90	CTU-100	CTU-115
Axial Fan Type CTUA Models	Axial Fan 16 in.	Axial Fan 500 mm	Axial Fan 500 mm	Axial Fan 16 in.	Axial Fan 16 in.	Axial Fan 500 mm	Axial Fan 500 mm
RG P/N	90750002	90750001	90750001	90750002	90750002	90750001	90750001
Quantity	1	1	1	2	2	2	2
Fan Rating (Watts per Fan)	250	600	600	250	250	600	600
Centrifugal Fan Type CTUB/C Models	Torin 241-241	Torin 241-241	Torin 241-241	Torin 270-270	Torin 270-270	Torin 270-270	Torin 270-270
RG P/N	A049	A049	A049	A047	A047	A047	A047
Quantity	1	2	2	2	2	3	3
Normal Fan Rating (W)	1100	1100	1100	1200	1200	1200	1200
High Fan Rating (W)	1400	1400	1400	1700	1700	1700	1700

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



ROBERTS GORDON®

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



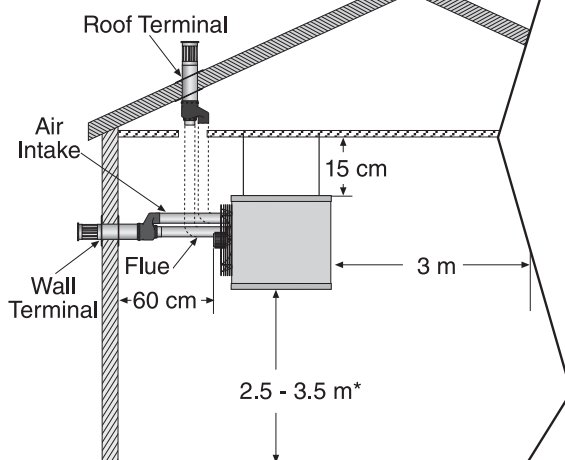
Fire Hazard

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

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

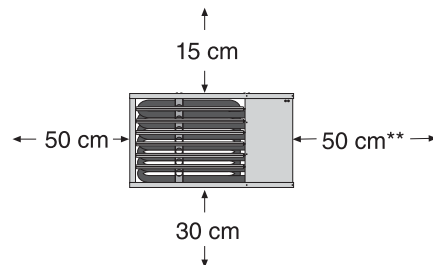
Failure to follow these instructions can result in death, injury or property damage.

Installation Clearances



*Heaters may be mounted at a higher level if destratification fans and/or turn down nozzles are installed.

Clearances to Combustibles



**80 cm is necessary to service heater.

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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 Europe Limited and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service, operation and labeling of the equipment. To help facilitate optimum performance and safety, Roberts-Gordon Europe Limited 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 Europe Limited.

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.

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