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 vapors 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.

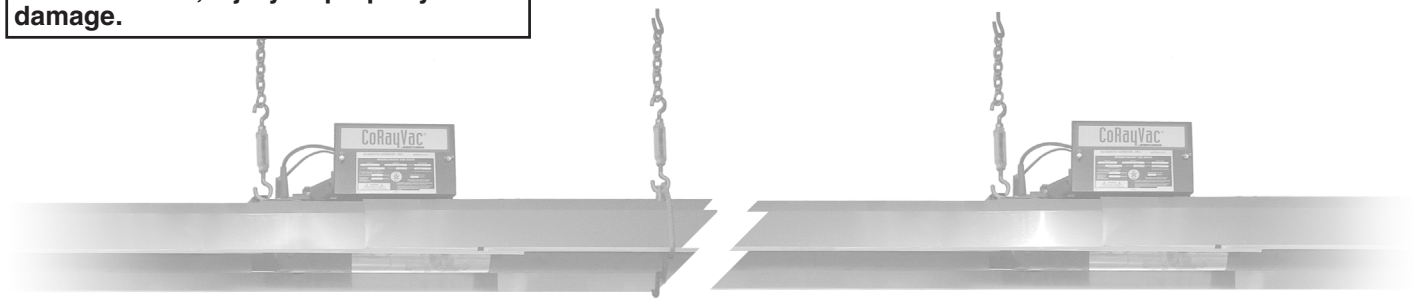
ROBERTS GORDON

CoRayVac®

Custom-Engineered, Low-Intensity Infrared Heating Systems

Installation, Operation & Service Manual

CRT-10
CRT-15
CRT-20
CRT-25
CRT-30



⚠ 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.

CE

Qualified for Energy Technology List
www.eca.gov.uk
TM

Authorised User No. 00184

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.

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128100UK Rev. E 05/11

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Printed in U.K.

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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 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 nonresidential 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, such as the reflector portion of the heater and the various venting components, 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 to the surface of the reflector.

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 resonable 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.

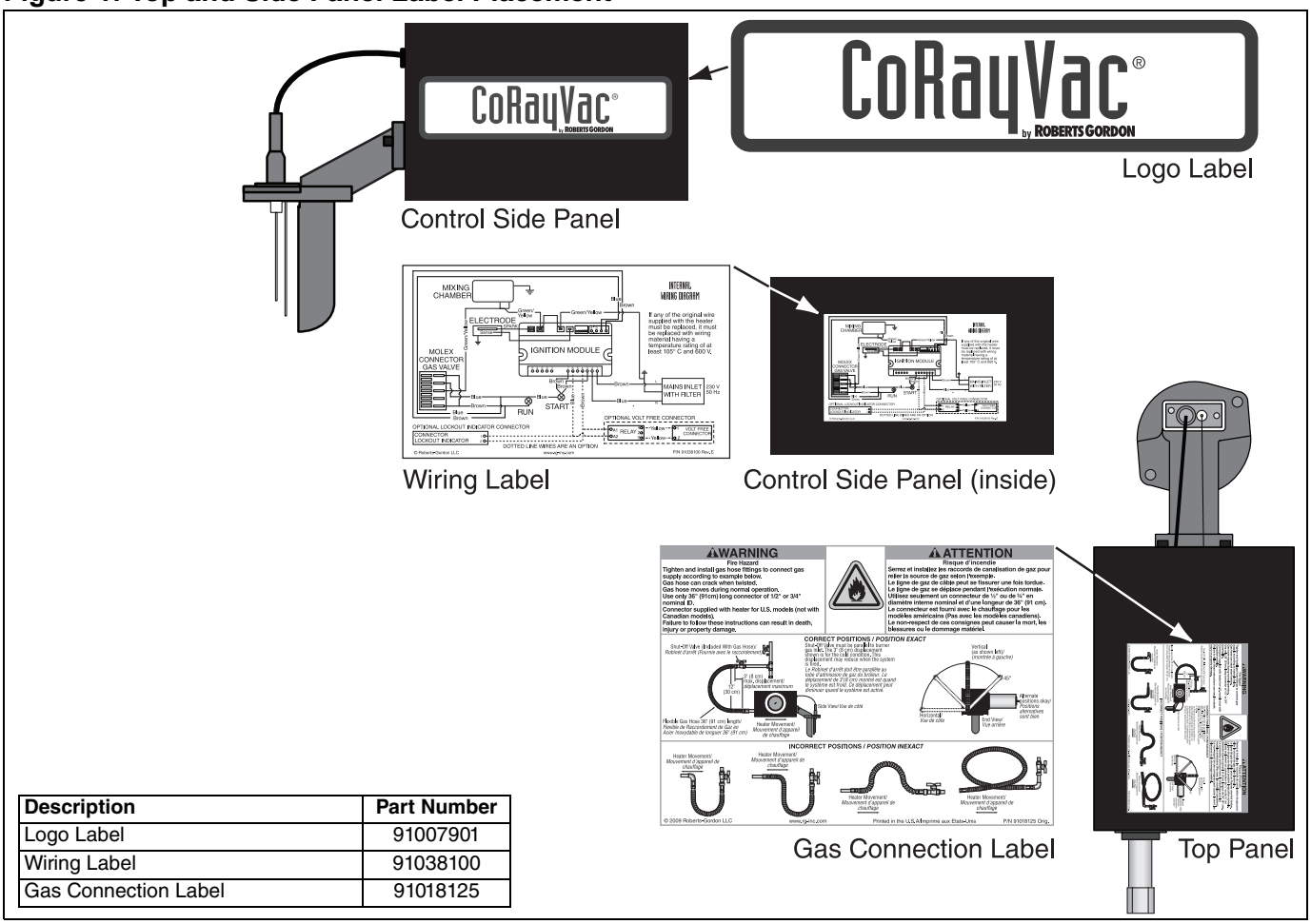
1.1 Manpower Requirements

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

1.2 Safety Labels and Their Placement

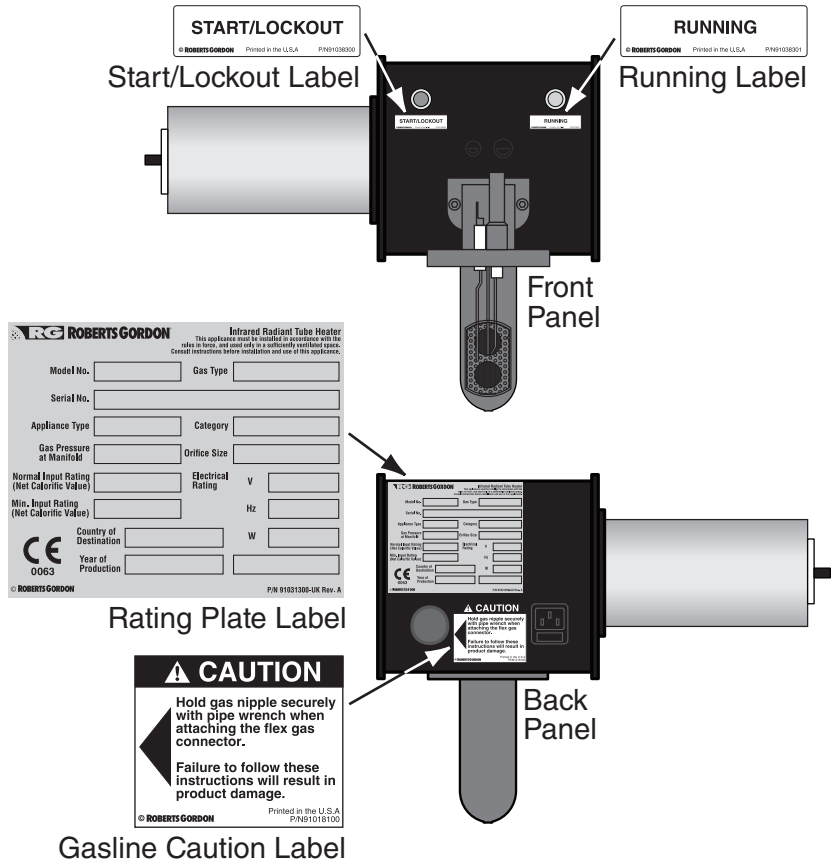
Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. *See Page 2, Figure 1 through Page 3, Figure 2*.

Figure 1: Top and Side Panel Label Placement



Description	Part Number
Logo Label	91007901
Wiring Label	91038100
Gas Connection Label	91018125

Figure 2: Front and Back Panel Label Placement



Description	Part Number
Start/Lockout Label	91038300
Running Label	91038301
Rating Plate Label	91031300
Gasline Caution Label	91018100

SECTION 2: INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- To ensure the system is designed in accordance with the parameters of the CORAYVAC® design manual (P/N 128500UK).
- 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 or fire marshal for guidance.
- To use the information given in a layout drawing and 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.
- To furnish all needed materials not furnished as standard equipment.
- To plan location of supports.
- To provide access to burners for servicing on all sides, for burner removal.
- To provide the owner with a copy of this installation, 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 there is adequate air circulation around the heater and to supply air for combustion and ventilation in accordance with local and national codes.
- To safely and adequately install heater using materials with a minimum working load of 33 kg (75 lbs).
- To ensure the heater is placed in a approved application.

2.1 Low Level User Instructions

In all situations, clearances to combustibles must be maintained. Signs should be posted in storage areas to specify the maximum stacking height of items placed below heater to maintain required clearances to combustibles. Minimum clearances must be maintained from vehicles parked below the heater. Caution should be used when running the system near combustible materials such as wood, paper, rubber, etc. Consideration should be given to partitions, storage racks, hoists, building construction,etc.

A laminated wall tag is available for the CORAYVAC® heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Please contact Roberts-Gordon or your ROBERTS GORDON® independent distributor to obtain the wall tag. 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 CORAYVAC® heater (e.g. thermostat or Controller).

A copy of the wall tag (P/N 91037912) is illustrated on the back cover. This copy of the wall tag must be affixed on the wall near the heater. 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. *See Page 6, Section 3.2*.

2.2 Corrosive Chemicals

⚠ CAUTION

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 Limted 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 life span of the heater components will be greatly reduced. An outside air supply must be provided to the burners whenever the presence of these compounds is suspected. 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 the 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

3.1 Required Clearances to Combustibles

Clearances are the required distances that combustible objects must be away from the heater to prevent serious fire hazards. 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 for all heater models are located *on Page 6, Figure 3 through Page 7, Figure 7* in this manual. 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 gasoline or other combustible materials including flammable objects, liquids, dust or vapors away from this heater or any other appliance.
- The stated clearances to combustibles represents a surface temperature of 32°C above room temperature. Building materials with a low heat tolerance (such as plastics, vinyl siding, canvas, triply, 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 Fire Marshal, 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 14, Figure 11*.
- If the radiant tubes must pass through the building structure, be sure that adequate sleeving and fire stop is installed to prevent scorching and/or fire hazard

⚠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.

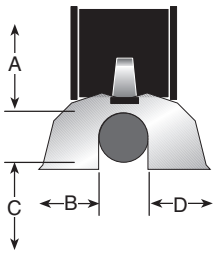
Failure to follow these instructions can result in death, injury or property damage.

3.2 Clearance Data

NOTE: 1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
2. Clearances B, C and D can be reduced by 50% after 7.5 m (25') of tubing downstream from where the burner and burner tube connect.
3. All measurements are in Millimeters.

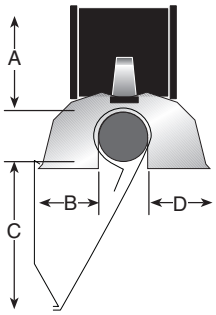
CLEARANCES TO COMBUSTIBLES

Figure 3: STANDARD REFLECTOR



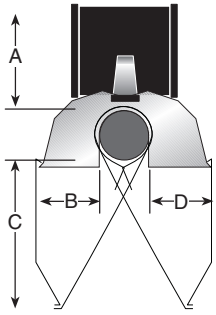
Model	A	B	C	D
CRT-10	150	510	1220	510
CRT-15	150	510	1220	510
CRT-20	150	510	1220	510
CRT-25	150	920	1530	920
CRT-30	150	920	1530	920

Figure 4: ONE SIDE REFLECTOR



Model	A	B	C	D
CRT-10	150	305	1430	510
CRT-15	150	305	1430	510
CRT-20	150	305	1430	510
CRT-25	150	305	1530	1070
CRT-30	150	305	1530	1070

Figure 5: TWO SIDE REFLECTORS

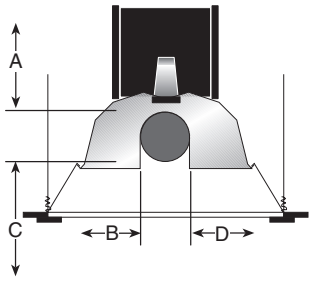


Model	A	B	C	D
CRT-10	150	305	1430	305
CRT-15	150	305	1430	305
CRT-20	150	305	1430	305
CRT-25	150	305	1530	305
CRT-30	150	305	1530	305

NOTE: 1. All dimensions are from the surfaces of all tubes, couplings, tees, elbows and crosses.
2. Clearances B, C and D can be reduced by 50% after 7.5 m (25') of tubing downstream from where the burner and burner tube connect.
3. All measurements are in Millimeters.

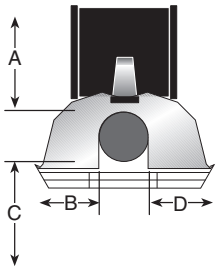
CLEARANCES TO COMBUSTIBLES

Figure 6: 2-FOOT DECO GRILLE



Model	A	B	C	D
CRT-10	150	305	1220	305
CRT-15	150	305	1220	305
CRT-20	150	305	1220	305
CRT-25	150	460	1430	460
CRT-30	150	460	1430	460

Figure 7: PROTECTIVE GRILLE



Model	A	B	C	D
CRT-10	150	510	1220	510
CRT-15	150	510	1220	510
CRT-20	150	510	1220	510
CRT-25	150	920	1530	920
CRT-30	150	920	1530	920

SECTION 4: MAJOR COMPONENTS

The figures in this section provide a general overview of component placement in a CORAYVAC® system. The location of some components such as supports and couplings is crucial for proper installation. Assemble the heater components as shown *on Page 12, Figure 10*.

Optional reflector configurations are shown *on Page 6, Figure 3 through Page 7, Figure 7*. Install appropriate suspension hardware, beam clamps, chain or rod at predetermined locations.

Figure 8: Major Component Descriptions

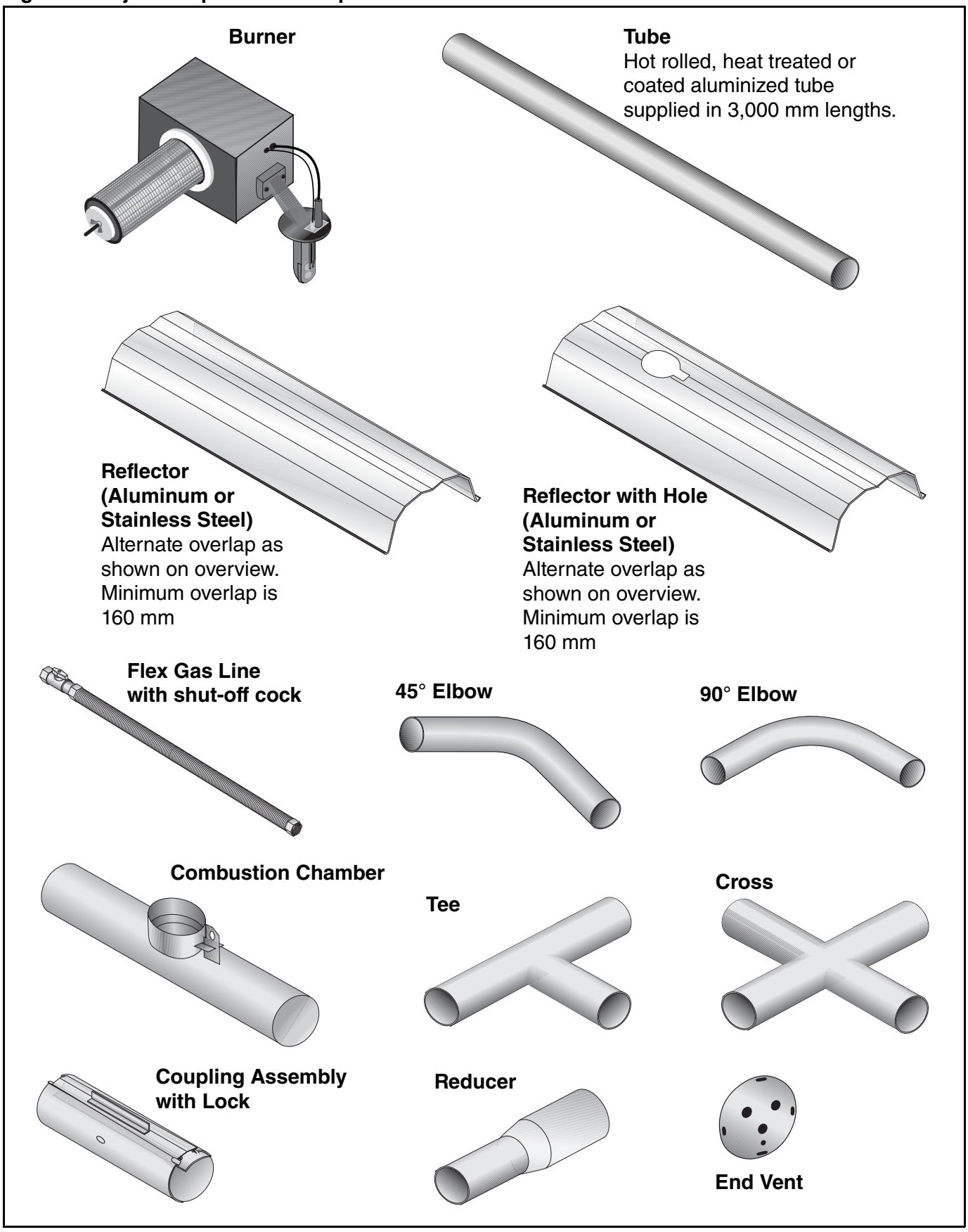
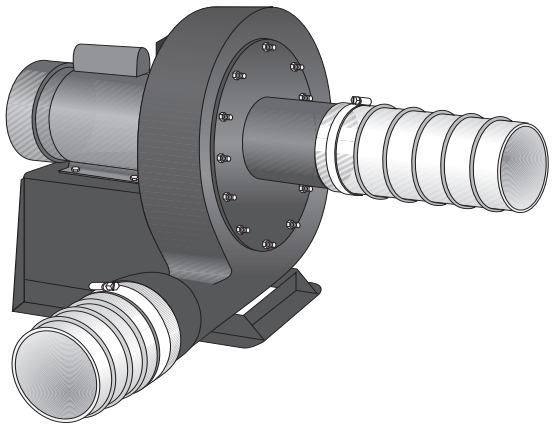
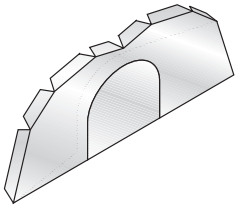


Figure 9: Major Component Descriptions (Continued)

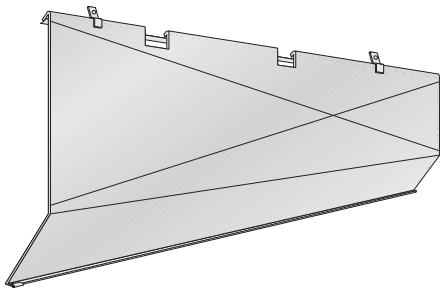
ROBERTS GORDON® NRG Control



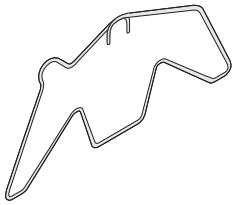
RG-30 and RG-45 Pump



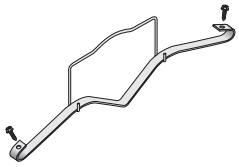
Reflector End Cap (Aluminum or Stainless Steel)
Remove center section to accommodate tube when necessary.



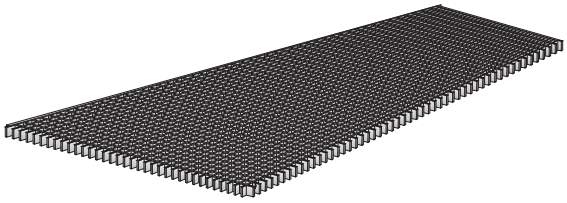
Reflector Side Extension



Tube and Reflector Hanger



Reflector Support Package

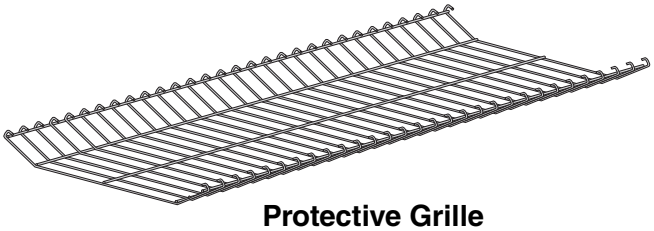


Deco Grille

S-Hook

Turnbuckle

Spring Hook



Protective Grille Sports Hall Guard

Bow Shackle

Reflector Side Extension Bracket

Non Return Valve (ISO-7Rc)

4.1 Standard Parts List

Table 1: Contents of CORAYVAC® Burner Carton

Part No.	Description	Quantity
E000XXXX	CORAYVAC® Burner (Rate and Fuel Varies)	1
E0007565	Accessory Package	-
01361200	Filter Support Disk	1
01367800	Combustion Chamber Gasket	1
02904000	Door Assembly w/ Hole	1
91119500	U-Clip	4
91905500	Filter Support	1
E0007588	Nut M8 Brass	2
92511601	Wing Nut #10 - 24	1
96411600	Lockwasher 5/16"	2
01312401	Filter and Gasket	1

Table 2: Common CORAYVAC® Components

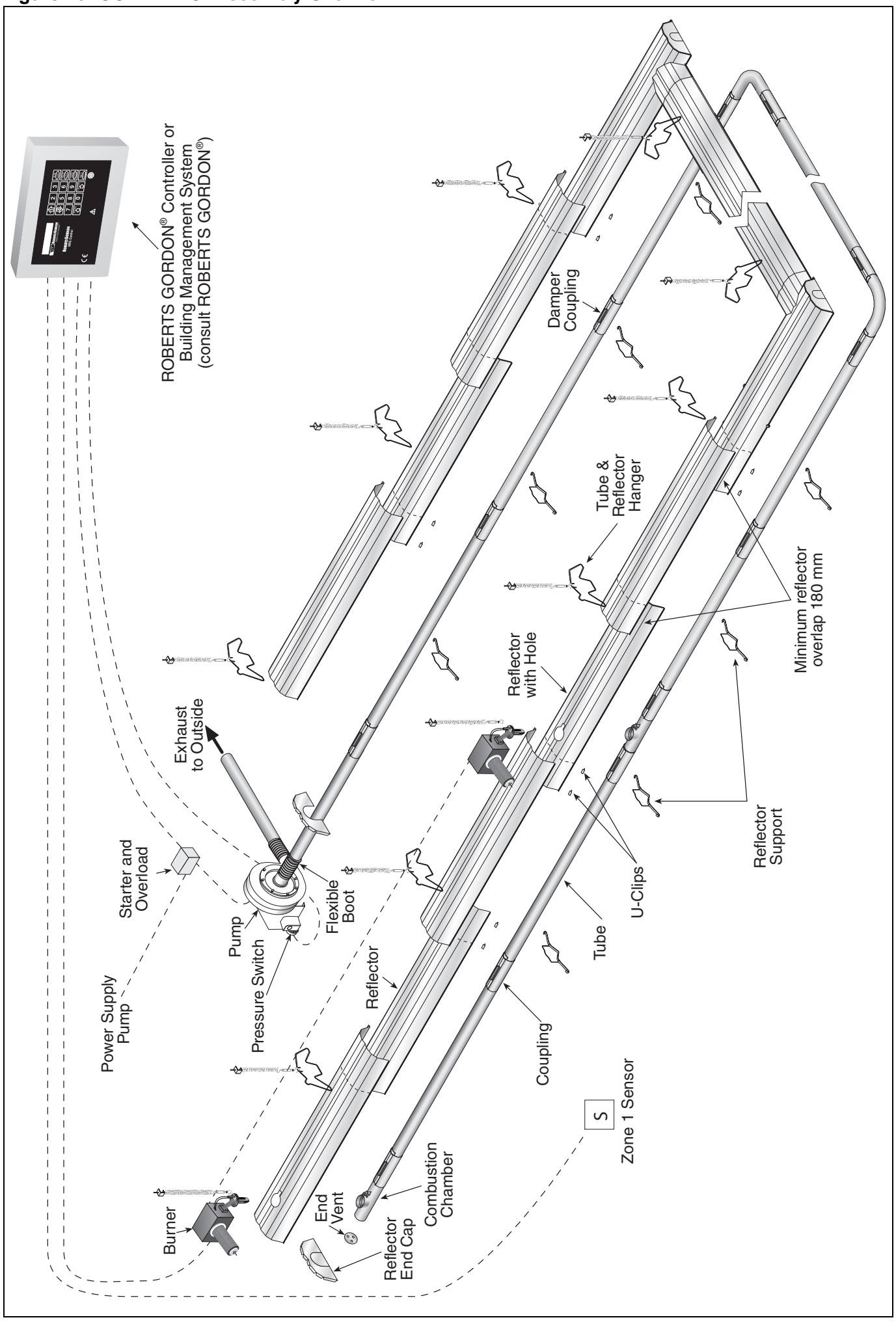
Part No.	Description
Combustion Chamber:	
02722302-1P	Aluminised Combustion Chamber
E0009400	1/2" Flex Gas Line Kit
E00094XX	End Vent Plate
Tubing and Related Accessories	
01312700	100 mm Coupling and Lock
01312700	150 mm Coupling and Lock
01331900	100 mm Coupling with Damper and Lock
E0009356	150 mm Coupling with Damper and Lock
01330203	100 mm Aluminised Tee
01330204	150 mm Aluminised Tee
01330903	100 mm Aluminised Cross
E0009167	150 mm Aluminised Cross
01335801	100 mm Aluminised 90° Elbow
T0100320	150 mm Aluminised 90° Elbow
01336101	100 mm Aluminised 45° Elbow
91409408	16 Ga. Heat Treated Aluminised 100 mm dia 3048 mm Tube
E0009105	16 Ga. Heat Treated Aluminised 150 mm dia 3048 mm Tube
E0009326	100 mm Tail Pipe Tube Hanger
03020700	150 mm Tail Pipe Tube Hanger
Venting and Fresh Air Supply Accessories	
C1376B	100 mm Outside Air Flex Duct (10 m)
F323	150 mm Roof & Wall Masterflash
F322	100 mm Roof & Wall Masterflash
F074A	Roof & Wall Terminal
F116	Roof & Wall Terminal
Reflectors and Related Accessories	
01329910	Reflector Side Extension Support
91107720	U Clip Package - 20 off
02750303	Aluminium Reflector
S5163W	Stainless Steel Reflector
02750304	Aluminium Reflector with Hole
S5164W	Stainless Steel Reflector with Hole
02750800	Aluminium Reflector End Cap
C2331B	Stainless Steel Reflector End Cap
C2332B	Stainless Steel Reflector End Cap with Hole
01329910	Reflector Side Extension Support
02751200	Retainer Side Extension Reflector
03090100	Tube and Reflector Hanger
E0007575	Turnbuckle Assembly
Controls and Thermostats	
D268	ROBERTS GORDON® NRG Control
S7418K	Starter RG-30 Pump
S7445K	Starter RG-45 Pump
Deco Grille 305mm x 2438mm	
01363003	Bracket
91406700	305 x 2438 mm Protective Grille
Deco Grille 610mm x 1219mm	
01365900	Shield Frame
01370412	Reflector Side Extension 305 x 1219 mm
91407000	Aluminium Grille 610 x 1219 mm
Protective Grille	
08050001	Protective Grille
08050002	Protective Grille End Cap
Pump Packages and Accessories	
S7421K	Vacuum Pump Kit RG30-3Ø
S7423K	Vacuum Pump Kit RG45-3Ø
S7425K	Vacuum Pump Kit RG30-1Ø
S7426K	Vacuum Pump Kit RG45-1Ø
Accessories	
E0007074	Pressure Switch
02718851	100 mm Drain Cap
02718852	150 mm Drain Cap
90201200	Non Return Valve

Some models will receive S-hooks (P/N 91907302) or Spring Hooks (P/N 91903300), rather than Bow Shackles.

SECTION 5: DESIGN REQUIREMENTS

The CRT-Series system's design is related to the system operation and performance required by the building being heated. Every effort should be made to follow the dimensions on the layout drawing. If deviations are necessary, either contact the company responsible for the layout design, ROBERTS GORDON®, or consult the CRT-Series Design Manual (P/N 128500UK).

Figure 10: CORAYVAC® Assembly Overview



SECTION 6: HEATER INSTALLATION

⚠WARNING

Severe Injury Hazard

Secure burner to combustion chamber with nuts and lockwashers.

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

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.

To ensure your safety, and comply with the terms of the warranty, all heaters must be installed in accordance with these instructions.

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

Do not locate the gas or electric supply lines directly over the path of the flue products from the heater or lay cables on top of the reflector.

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

The heater must be installed with clearances to combustibles as indicated in this instruction manual.

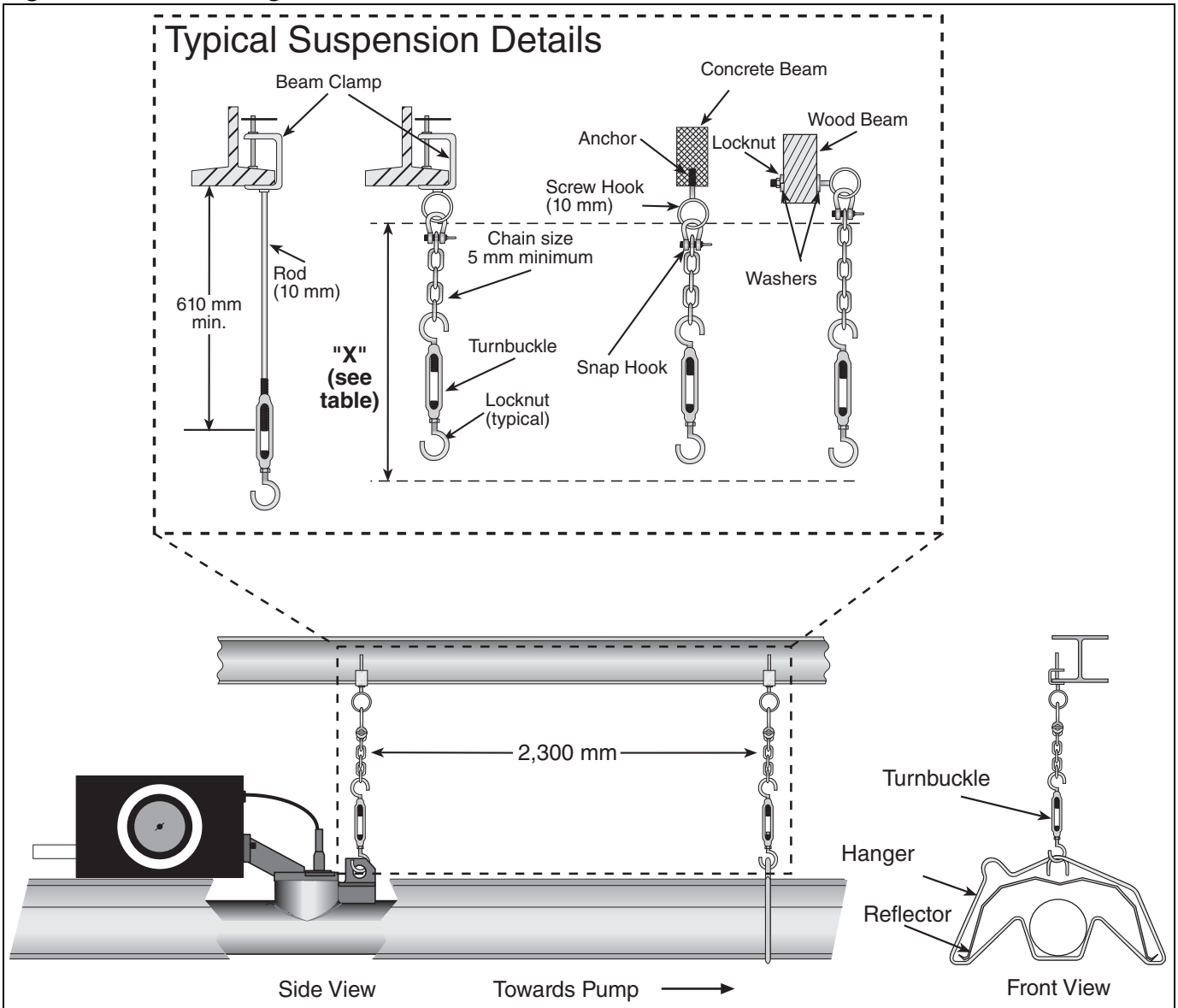
The minimum and maximum gas inlet pressures must be maintained as indicated in this manual. Typical installation configurations are shown in *Figure 11*.

Expansion and contraction of the tube dictates that the minimum suspension lengths must be maintained. *See table on Page 14, Figure 11*.

For mounting height and tube lengths *See Page 52, Section 16.6*.

NOTE: Some models will receive S-hooks (P/N 91907302) or Spring Hooks (P/N 91903300), rather than Bow Shackles.

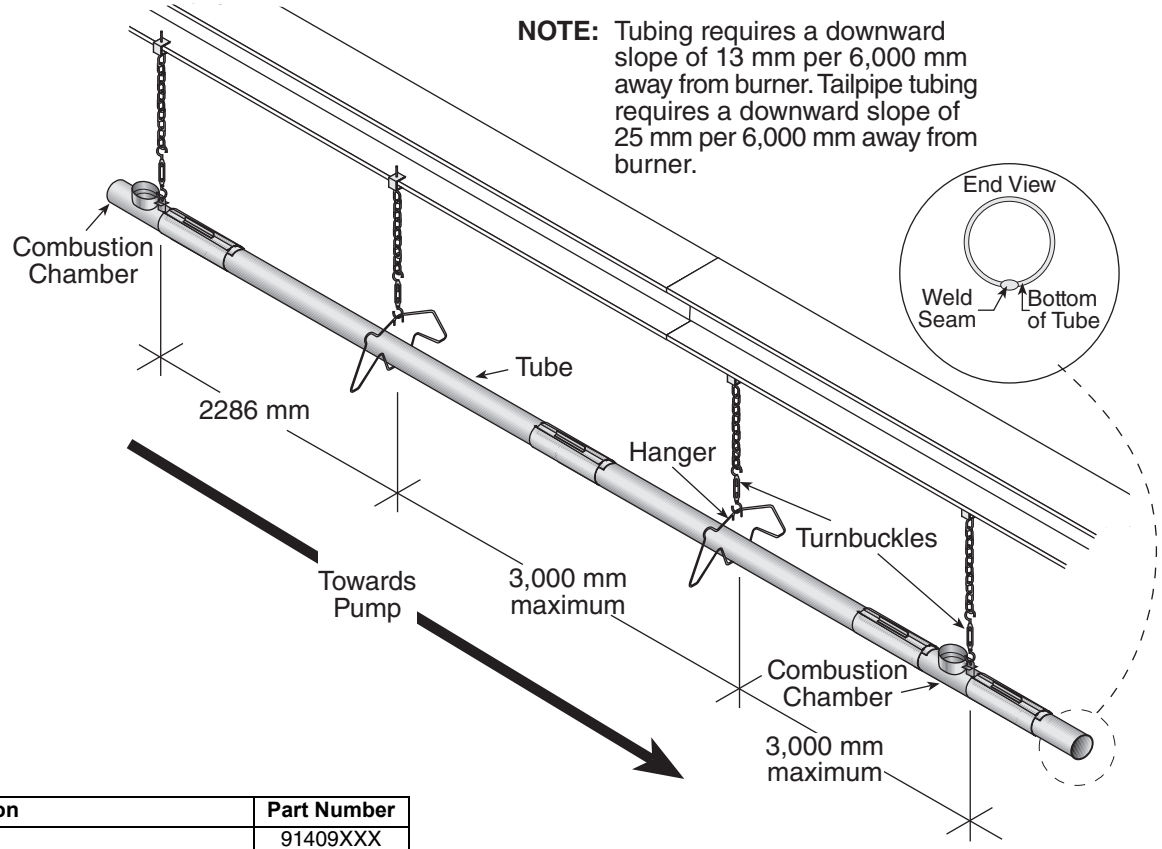
Figure 11: Critical Hanger Placement



Description	Part Number
Turnbuckle	91903201
S-hooks	91907302
Spring Hooks	91903300
Bow Shackle	E0007576
Tube/Reflector Hanger	03090100

Run Length	Typical Expansion	Minimum “X” Length
15,000 mm	±25 mm	300 mm
31,000 mm	±50 mm	600 mm
46,000 mm	±75 mm	900 mm
61,000 mm	±100 mm	1200 mm
76,000 mm	±125 mm	1450 mm

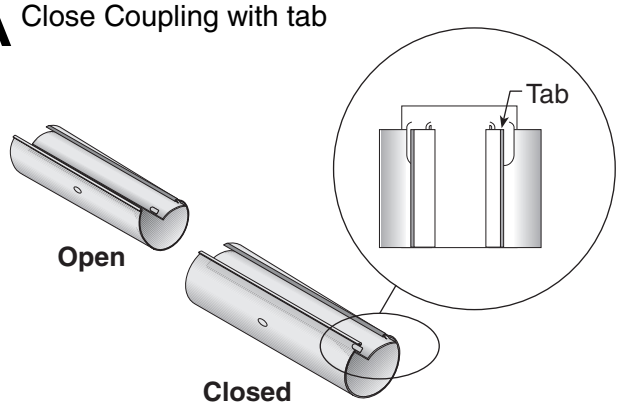
Step 6.1 Tube Installation



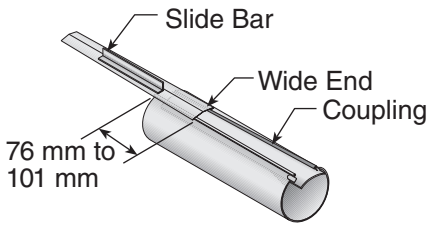
Description	Part Number
Tube	91409XXX
Turnbuckle	91903201
Tube/Reflector Hanger	03090100

Step 6.2 Coupling and Tube Assembly

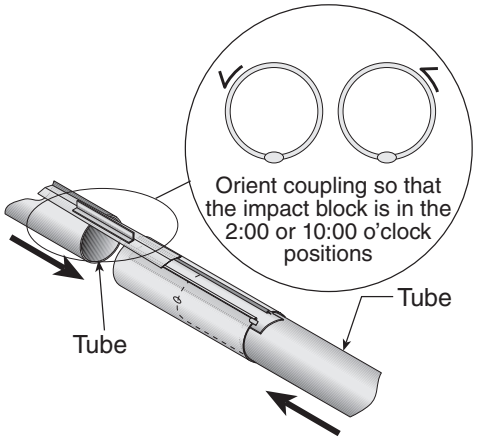
A Close Coupling with tab



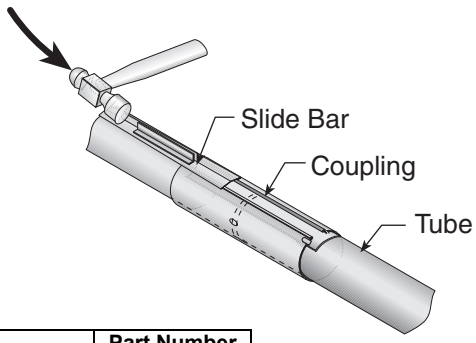
B Start Slide Bar/Coupling Lock onto Coupling



C Insert Tubes into Coupling



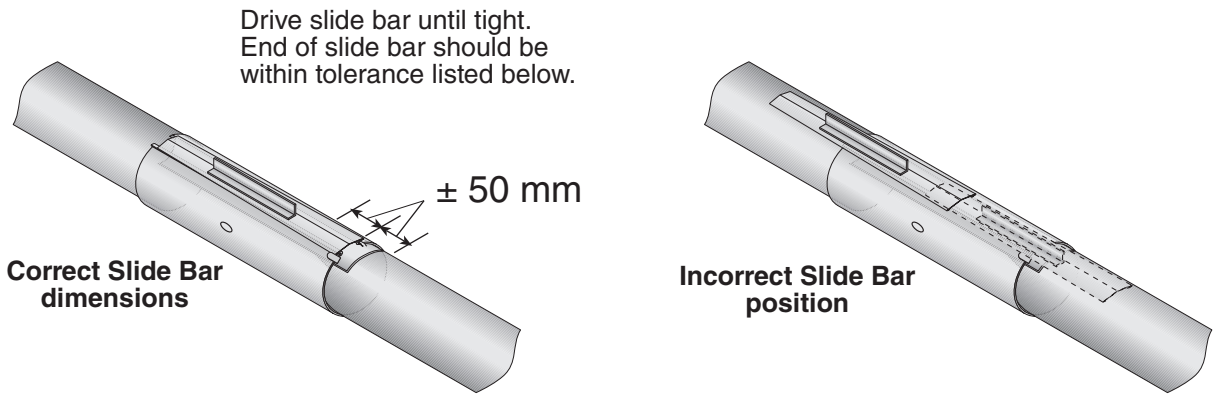
D Tighten Coupling to join Tubes



Description	Part Number
Coupling	01329600
Slide Bar/Coupling Lock	01329700
Tube	91409XXX

Step 6.2.1 Coupling and Tube Assembly (Continued)

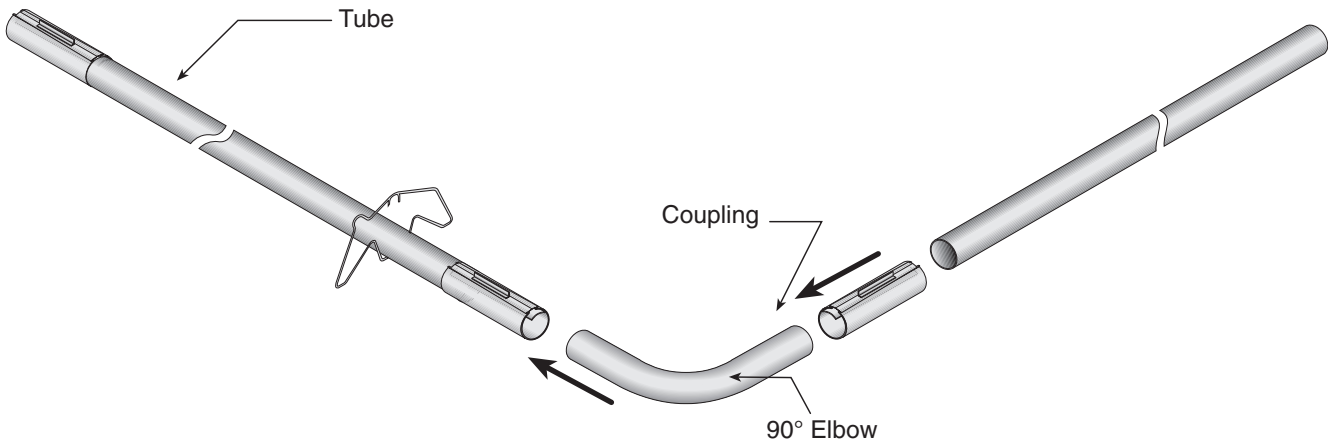
Tighten Slide Bar as shown below.



Repeat *Section Step 6.2 on Page 15*, A - D until all tubes are assembled.

6.3 Elbow Configuration

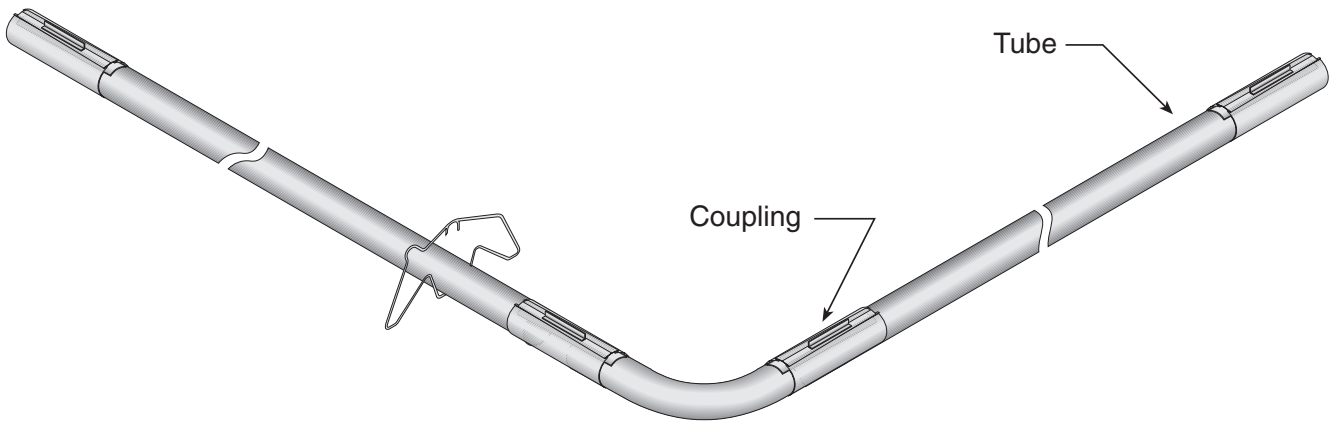
Step 6.3.1 Elbow Installation



Description	Part Number
Elbow Package	**02718702**
90° Elbow	01335801
Coupling	01312700
Reflector End Cap	02750800
Reflector Joint Piece	02750900
U-clip Package	91107720

Minimum Distance Required Between Burner and Elbow	
Model	**Minimum Distance**
CRT-10	1,500 mm
CRT-15	1,500 mm
CRT-20	3,000 mm
CRT-25	3,000 mm
CRT-30	4,500 mm

Step 6.3.2 Elbow Installation



Step 6.4 Reflector Installation

⚠ WARNING

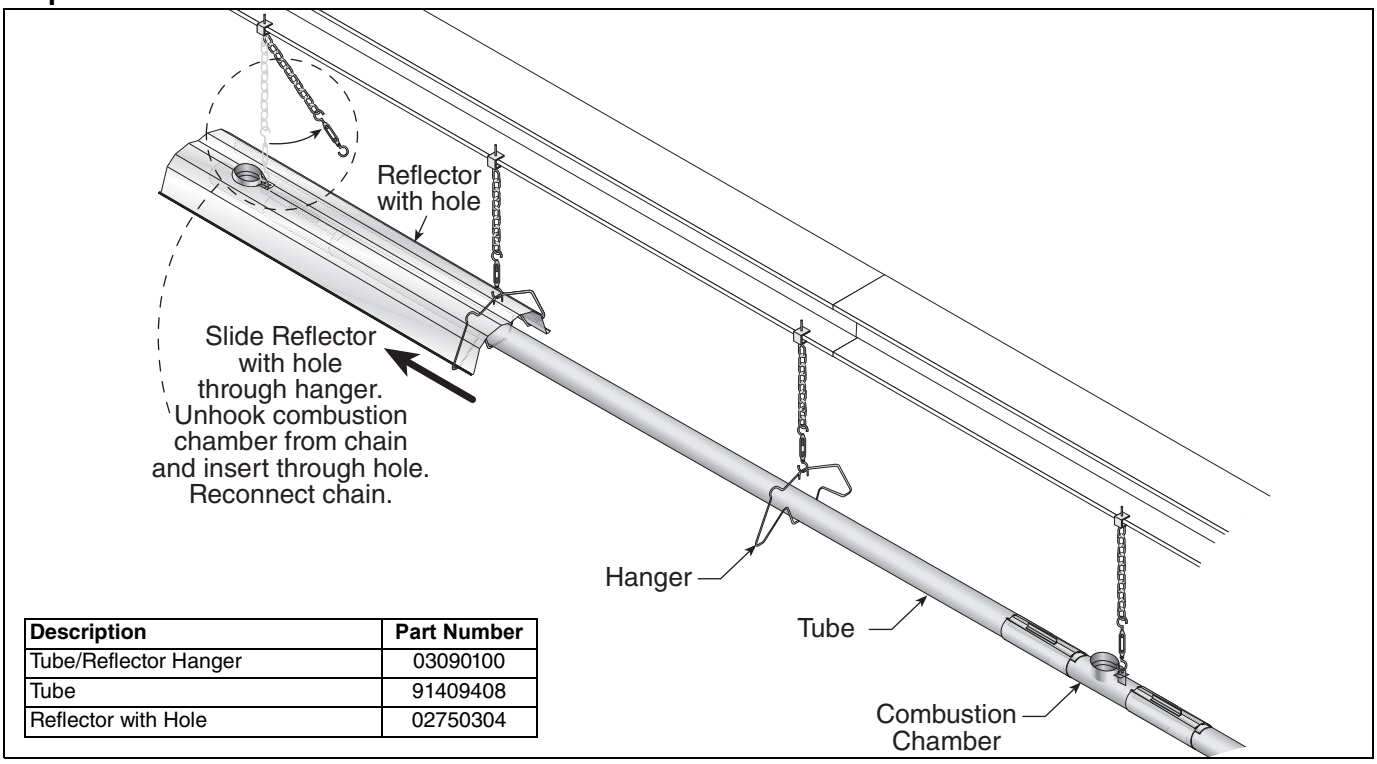
Fire Hazard

Support reflector with reflector hanger and support strap.

Reflector must not touch tube.

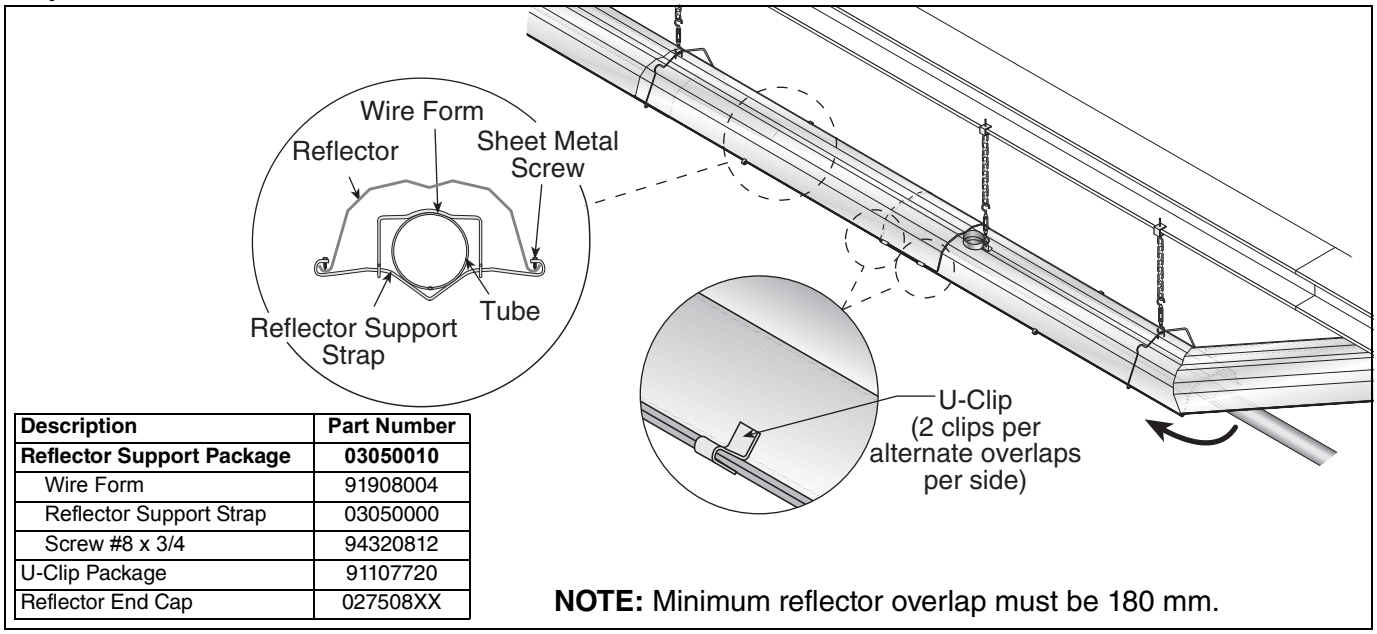
Failure to follow these instructions can result in death, injury or property damage.

Step 6.4.1 Reflector Installation with Hole



Description	Part Number
Tube/Reflector Hanger	03090100
Tube	91409408
Reflector with Hole	02750304

Step 6.4.2 Reflector Installation



Description	Part Number
Reflector Support Package	**03050010**
Wire Form	91908004
Reflector Support Strap	03050000
Screw #8 x 3/4	94320812
U-Clip Package	91107720
Reflector End Cap	027508XX

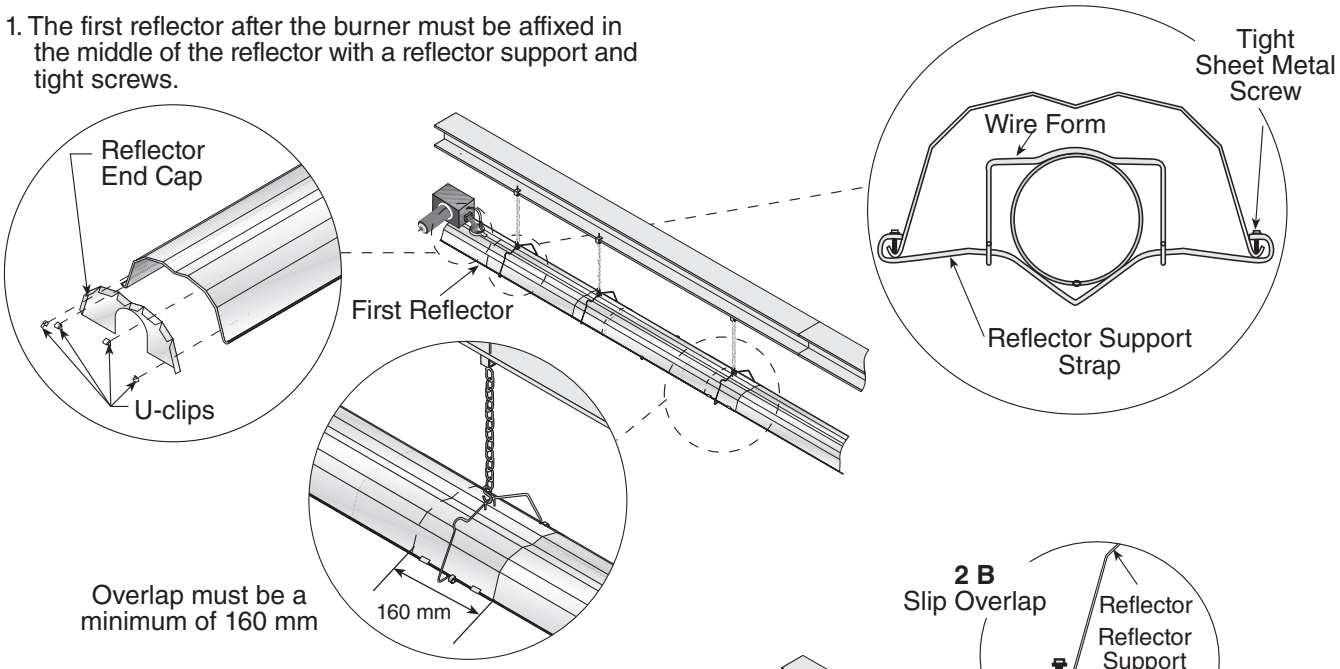
NOTE: Minimum reflector overlap must be 180 mm.

Step 6.4.3 Reflector, U-clip and Reflector Support Installation

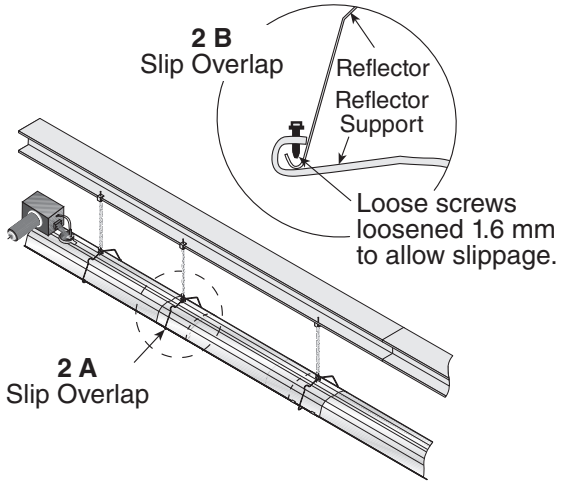
The pictorial drawings of the heater construction in *Section 6* are schematic only and provide a general guideline of where hangers, reflector supports and u-clips are to be installed.

To ensure proper expansion and contraction movement of the reflectors, a combination of u-clips and reflector supports are used. The positioning of reflector supports and u-clips depend on the individual installation. Use either pop rivets or sheet metal screws instead of u-clips when installing end caps and joint pieces in areas where impact and high wind may be a factor. The following rules must be observed:

1. The first reflector after the burner must be affixed in the middle of the reflector with a reflector support and tight screws.

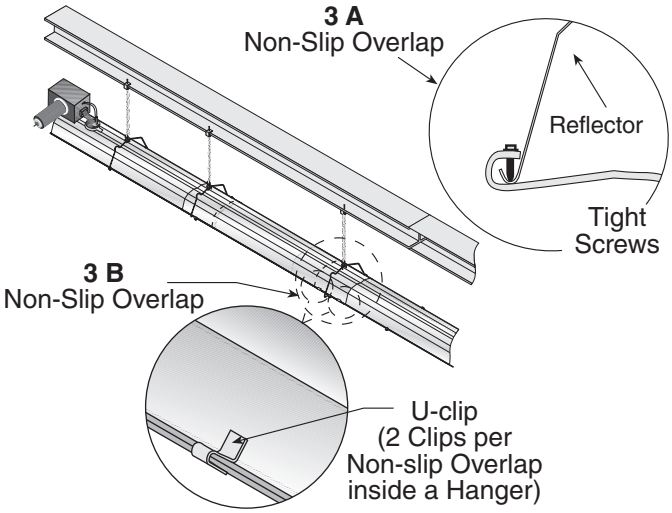


2. The overlap at the first and second reflector is a **slip overlap**. Thereafter, every third reflector joint is a slip overlap. A slip overlap is achieved by either:
   a.) both reflectors lay inside a hanger. (No reflector support needed).
   b.) using a reflector support with loose screws at the reflector overlap.



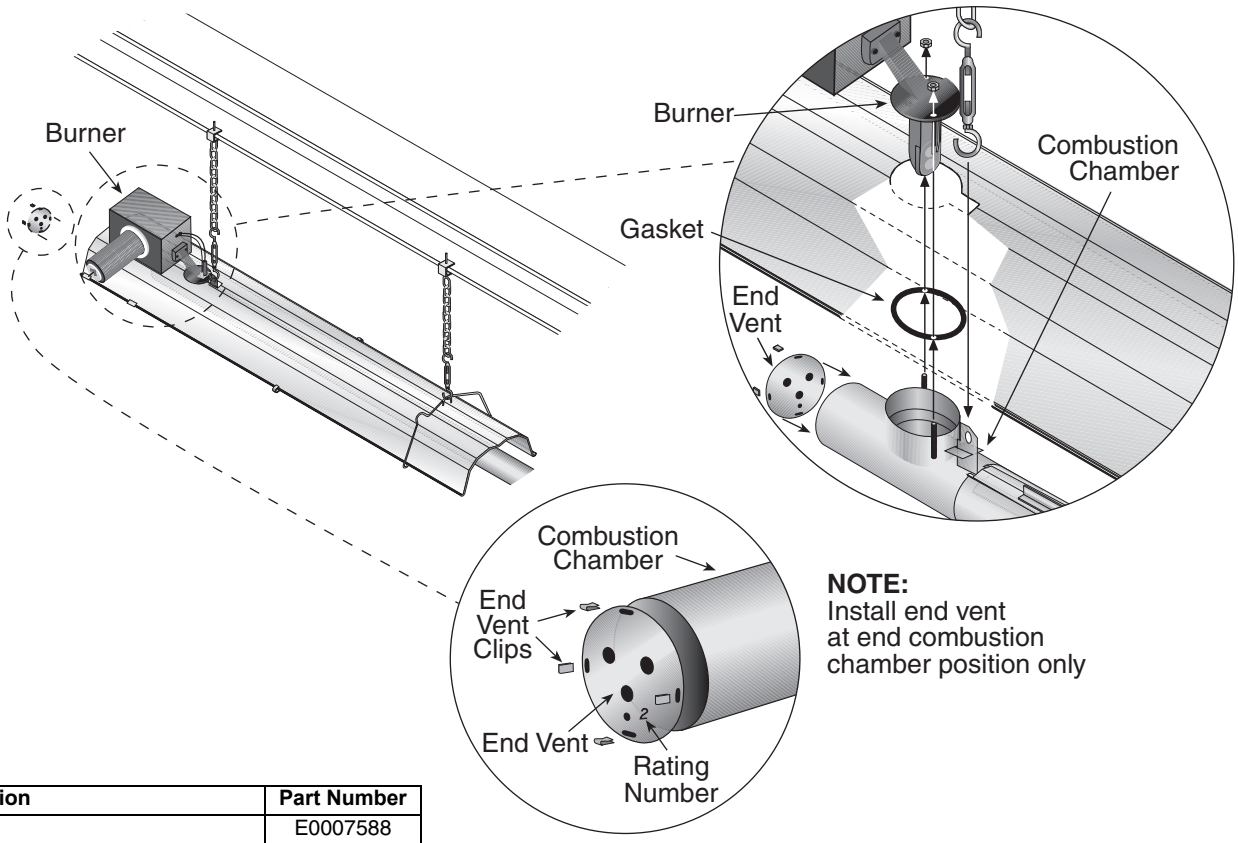
3. The remaining reflector overlaps require a **non-slip overlap connection.** To affix the reflectors together in a non-slip overlap either:
   a.) use reflector support and tight screws.
   b.) if both reflectors lay inside a hanger, u-clips or sheet metal screws may be used.

   This section of three reflectors joined together must be affixed to the tube with at least one reflector support with tight screws.



Description	Part Number
Reflector Support Package	**03050010**
Wire Form	91908004
Reflector Support Strap	03050000
Screw #8 x 3/4	94320812
U-Clip Package	91107720
Reflector End Cap	027508XX

Step 6.5 Burner Installation



Description	Part Number
Bolt	E0007588
Burner	E000XXXX
Lock Washer	96411600
Gasket	01367800
End Vent	E00094XX

SECTION 7: OPTIONAL HEATER ACCESSORIES

⚠WARNING

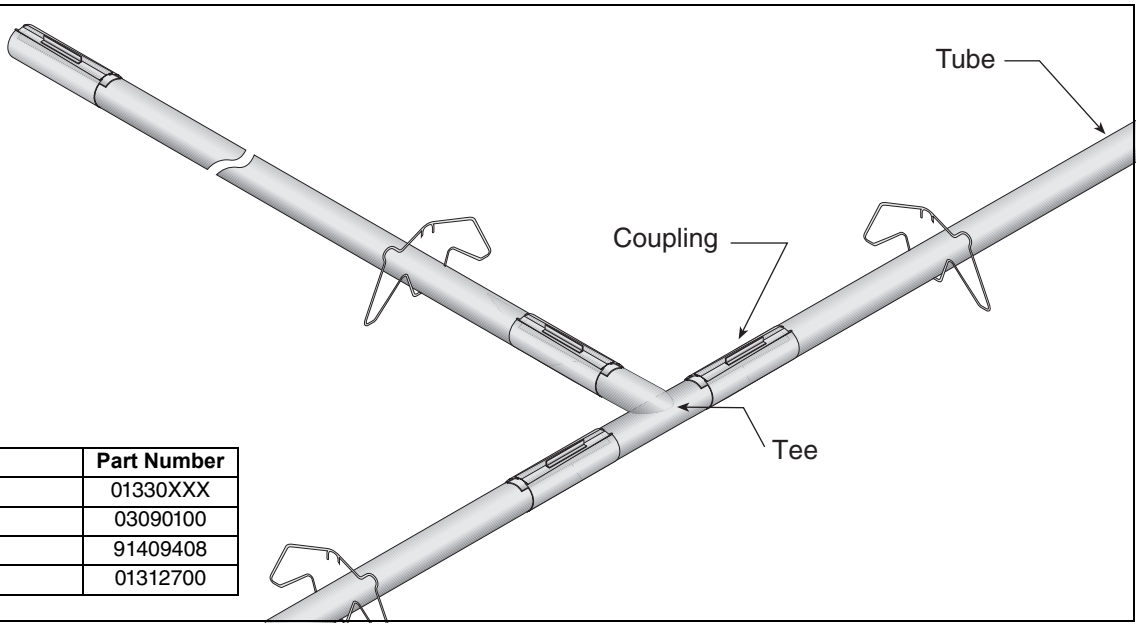
Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

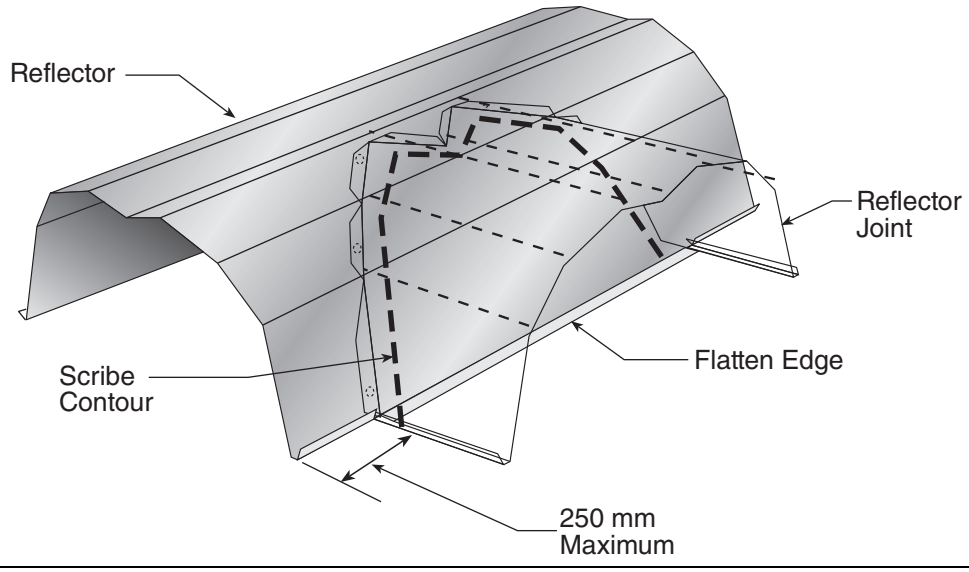
Step 7.1 Tee Installation



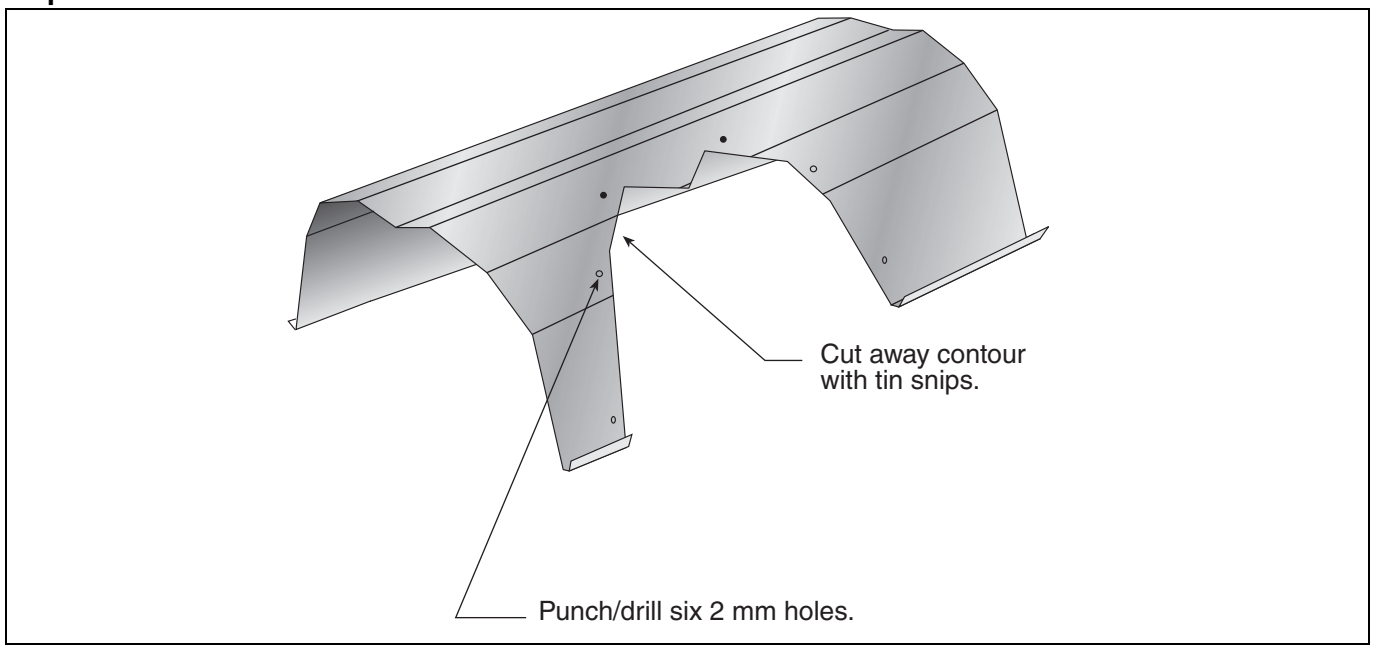
Description	Part Number
Tee	01330XXX
Tube/Reflector Hanger	03090100
Tube	91409408
Coupling	01312700

Step 7.2 Reflector Joint

Step 7.2.1 Reflector Joint Installation



Step 7.2.2 Reflector Joint Installation



Step 7.2.3 Reflector Joint Detail

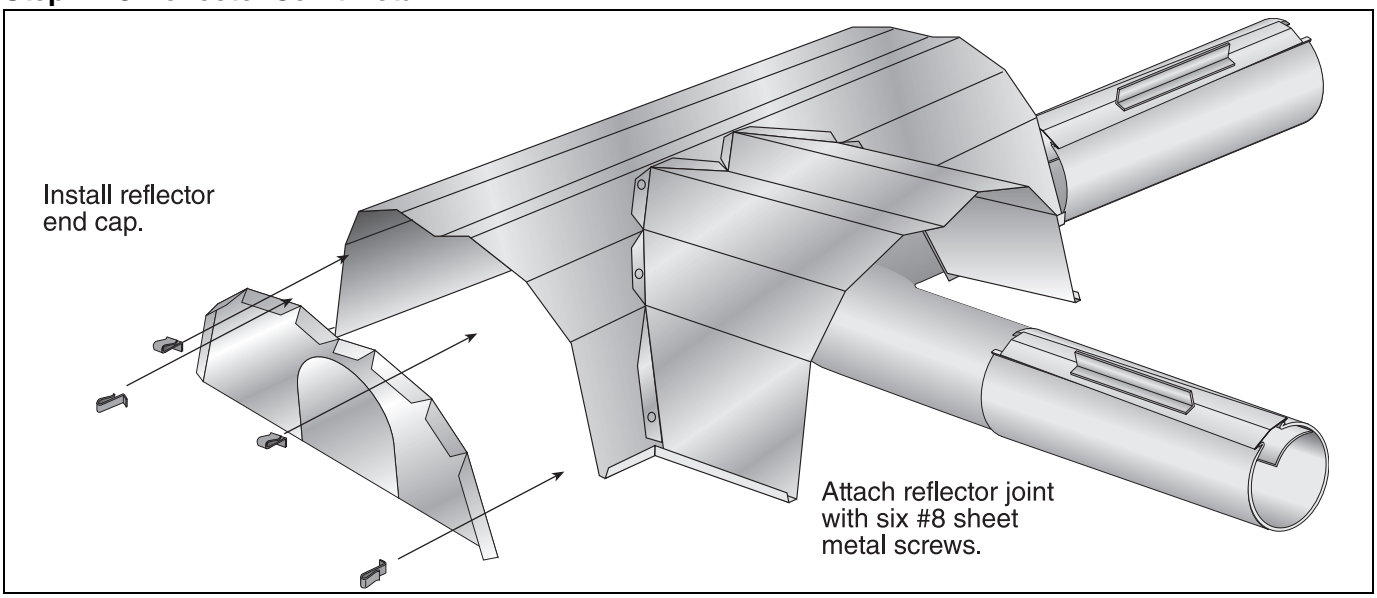
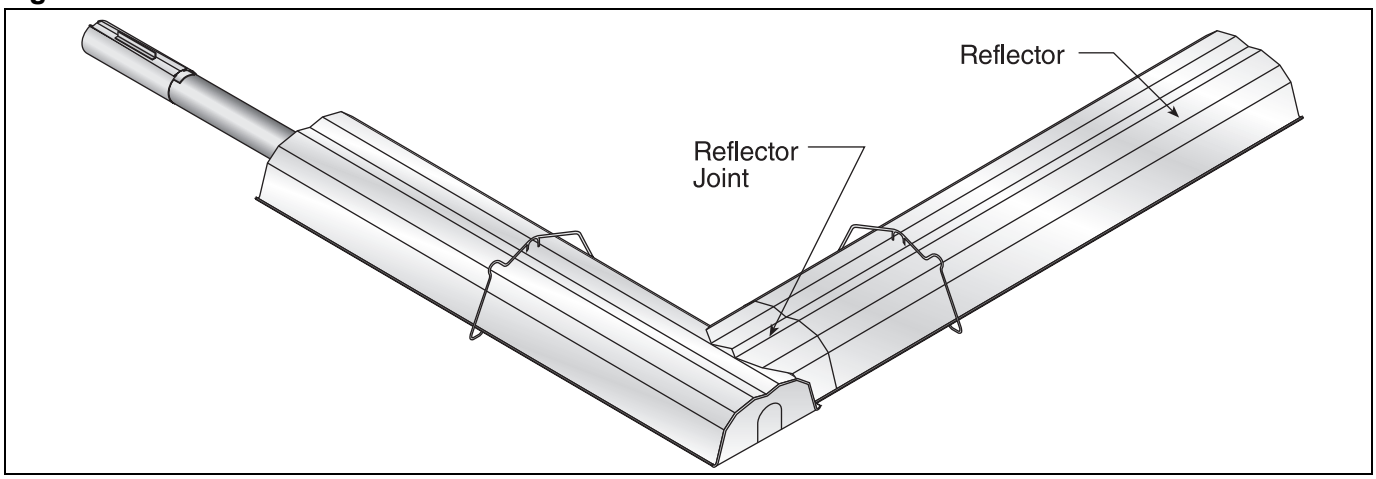
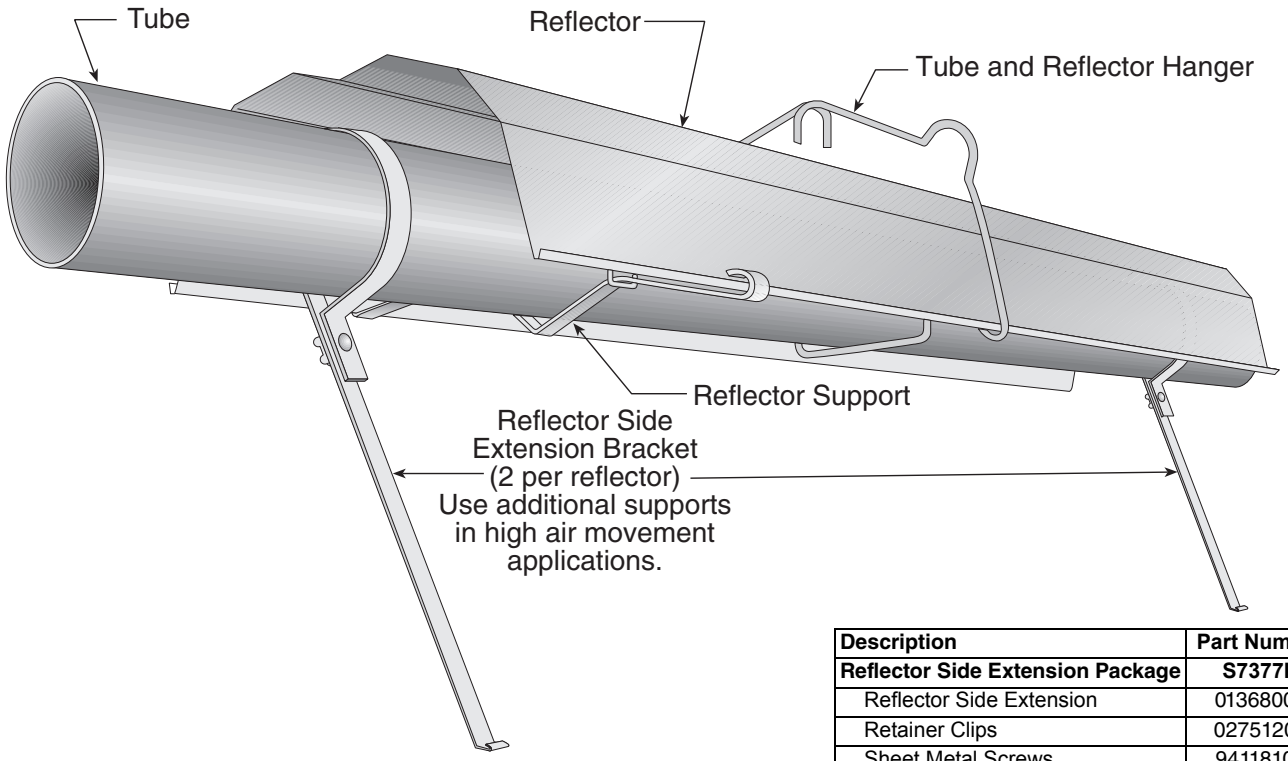


Figure 12: Reflector Joint Detail



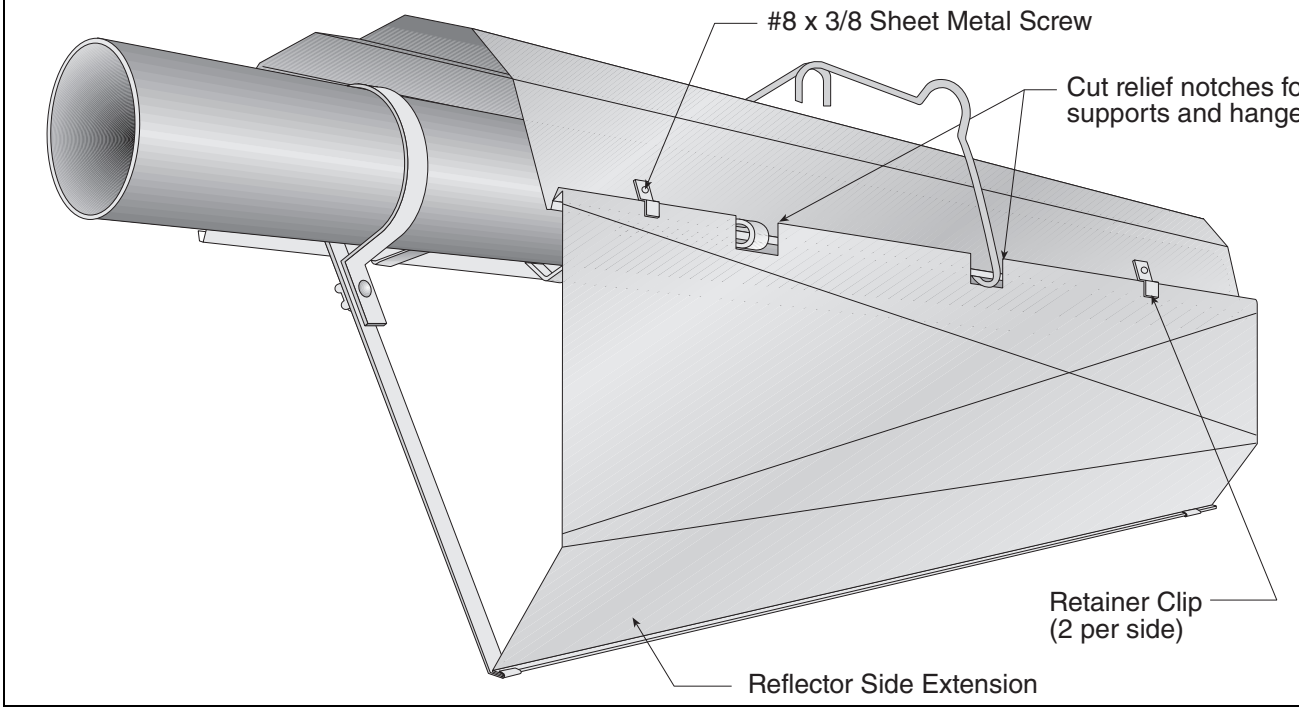
7.3 Reflector Side Extension

Step 7.3.1 Bracket Installation



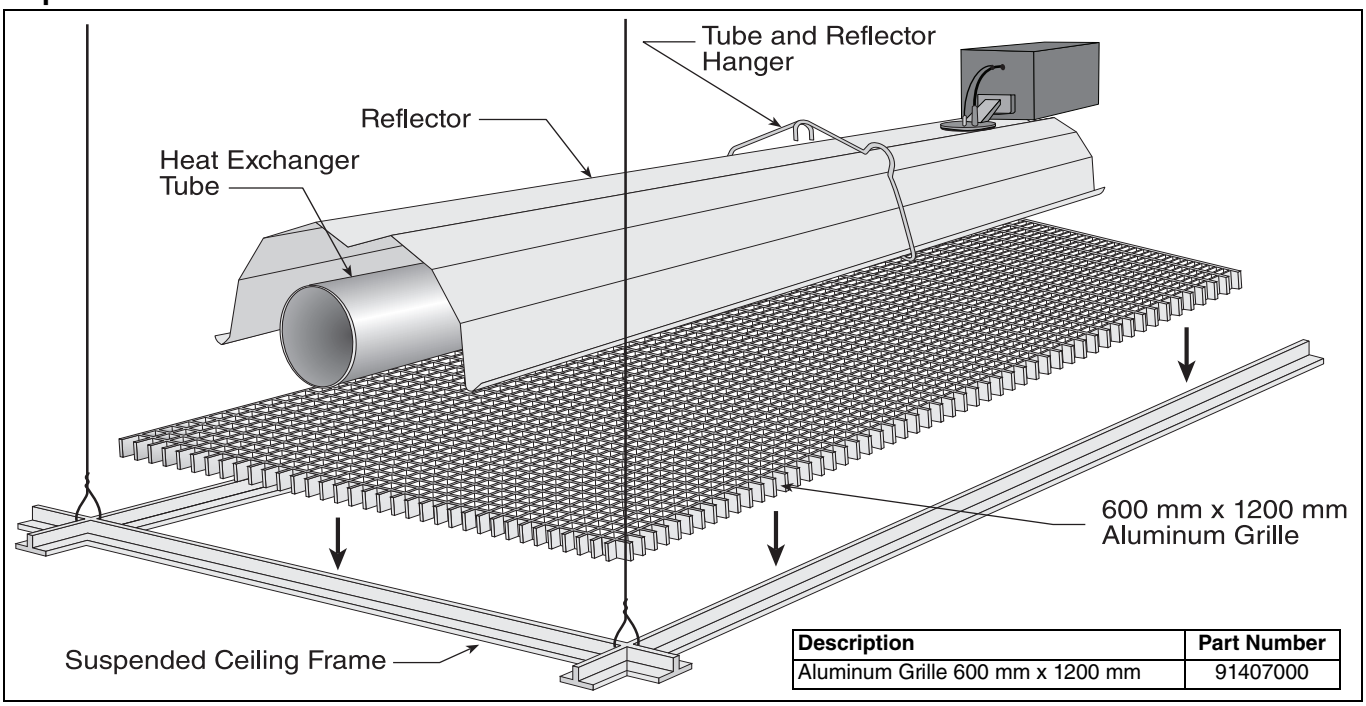
Description	Part Number
Reflector Side Extension Package	**S7377K**
Reflector Side Extension	01368000
Retainer Clips	02751200
Sheet Metal Screws	94118106
Order Separately	
Reflector Side Extension Bracket	01329910

Step 7.3.2 Side Reflector Installation



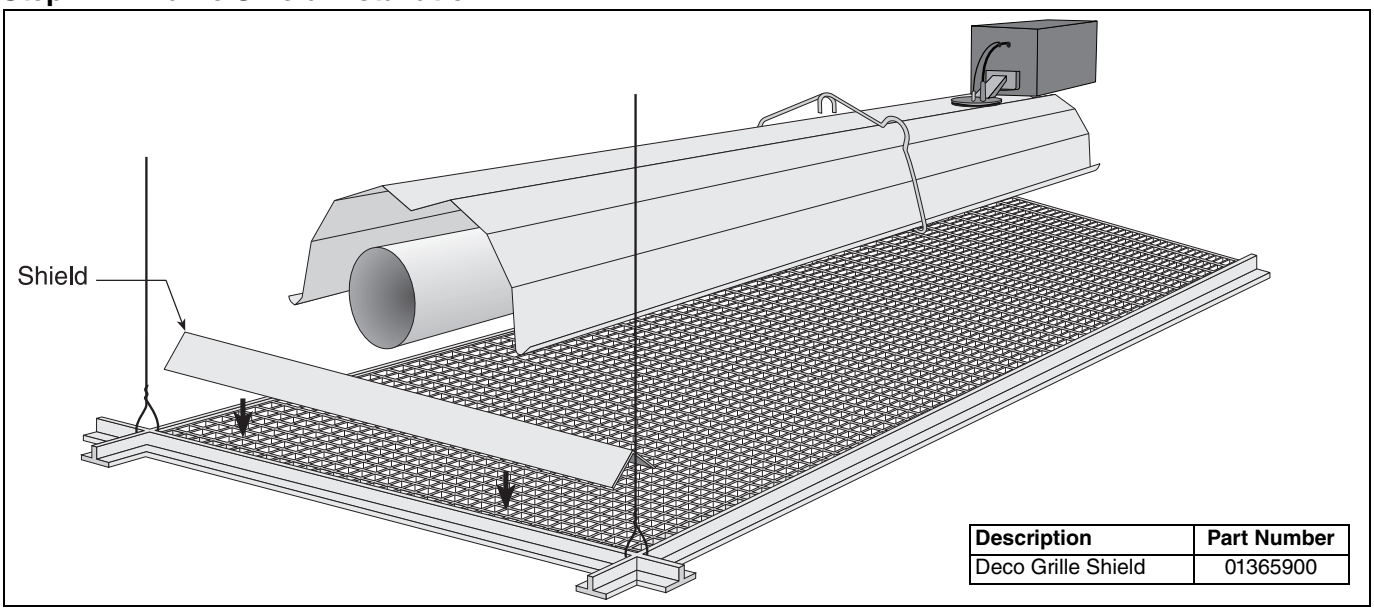
7.4 Two-Foot Decorative Grille Installation

Step 7.4.1 Grille Installation



Description	Part Number
Aluminum Grille 600 mm x 1200 mm	91407000

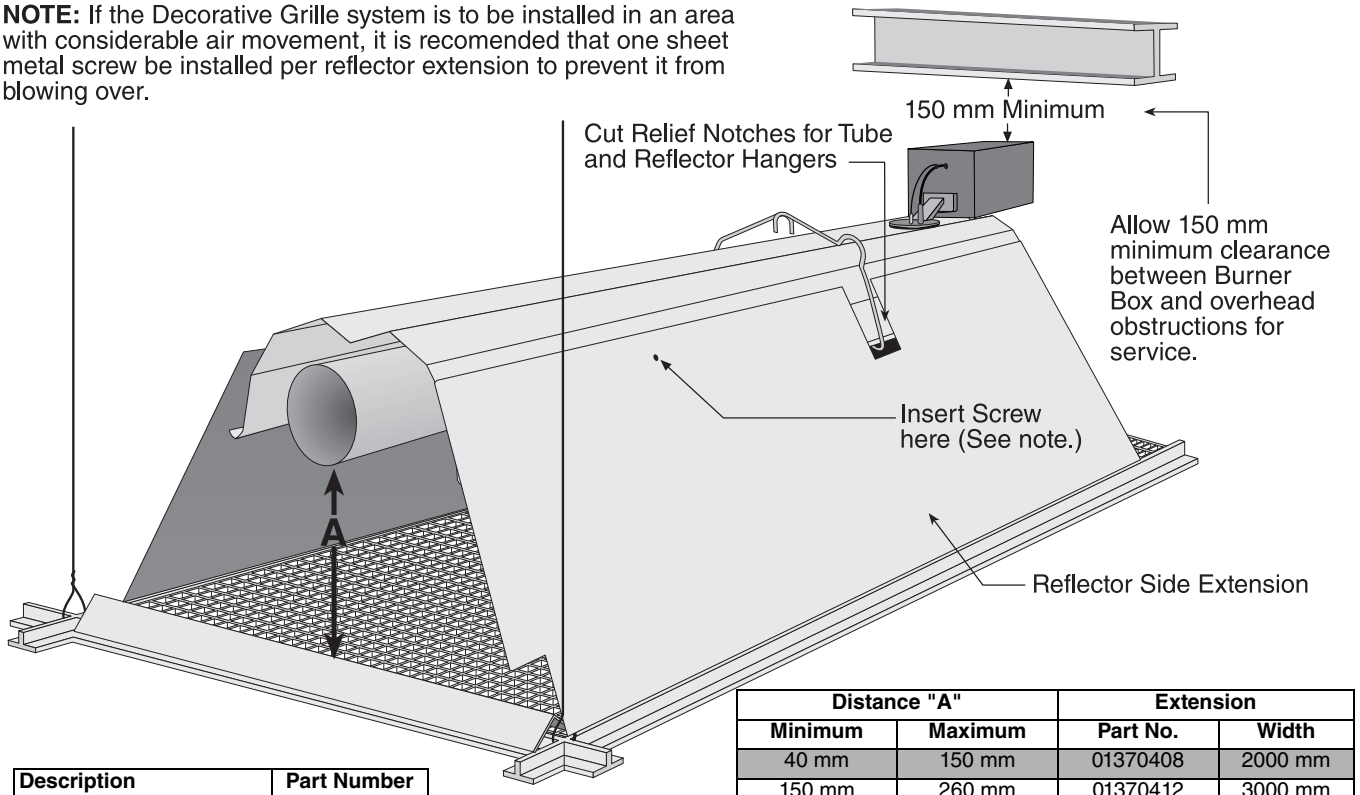
Step 7.4.2 Frame Shield Installation



Description	Part Number
Deco Grille Shield	01365900

Step 7.4.3 Reflector Side Extension Installation for Decorative Grilles

NOTE: If the Decorative Grille system is to be installed in an area with considerable air movement, it is recomended that one sheet metal screw be installed per reflector extension to prevent it from blowing over.

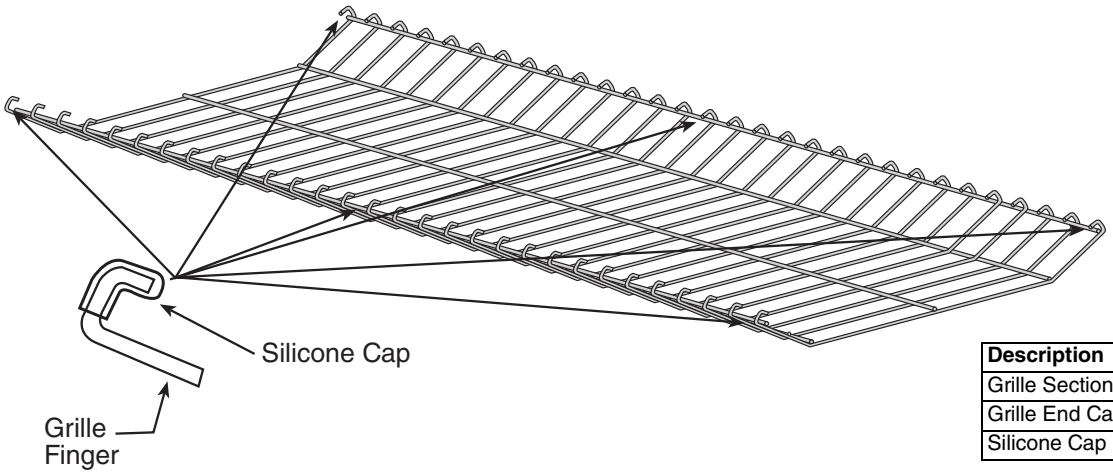


Description	Part Number
Reflector Side Extension	01370412

Distance "A"		Extension	
Minimum	Maximum	Part No.	Width
40 mm	150 mm	01370408	2000 mm
150 mm	260 mm	01370412	3000 mm
260 mm	370 mm	01370416	4000 mm

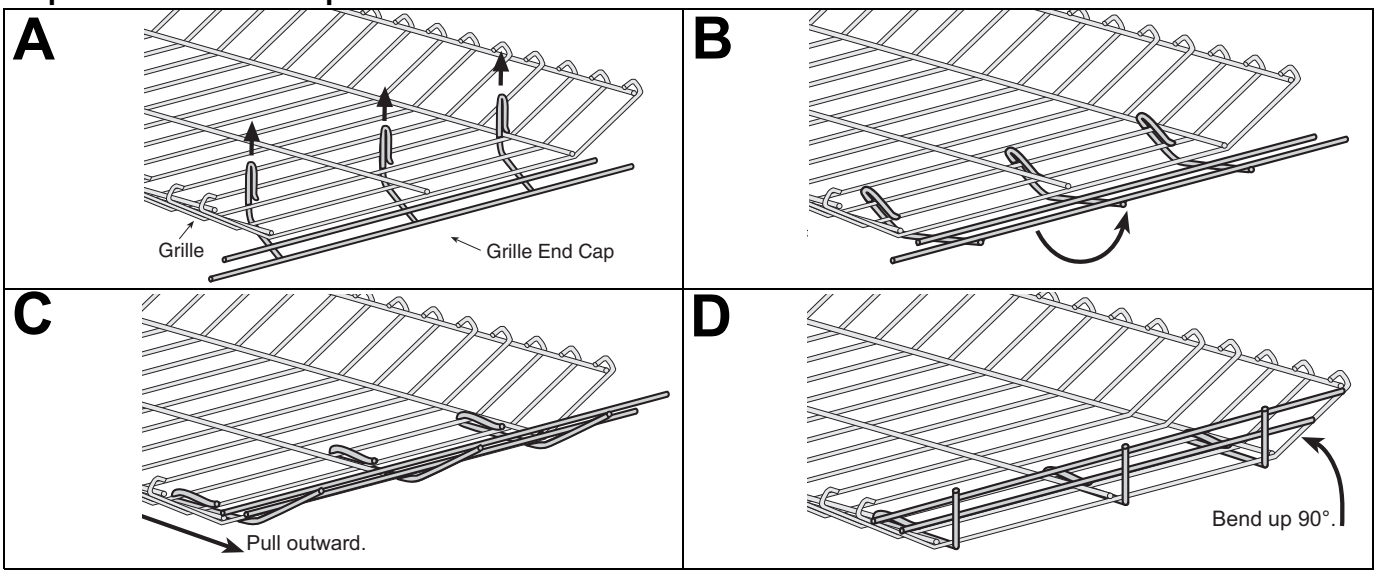
7.5 Protective Grille Installation

Step 7.5.1 Silicone Cap Installation

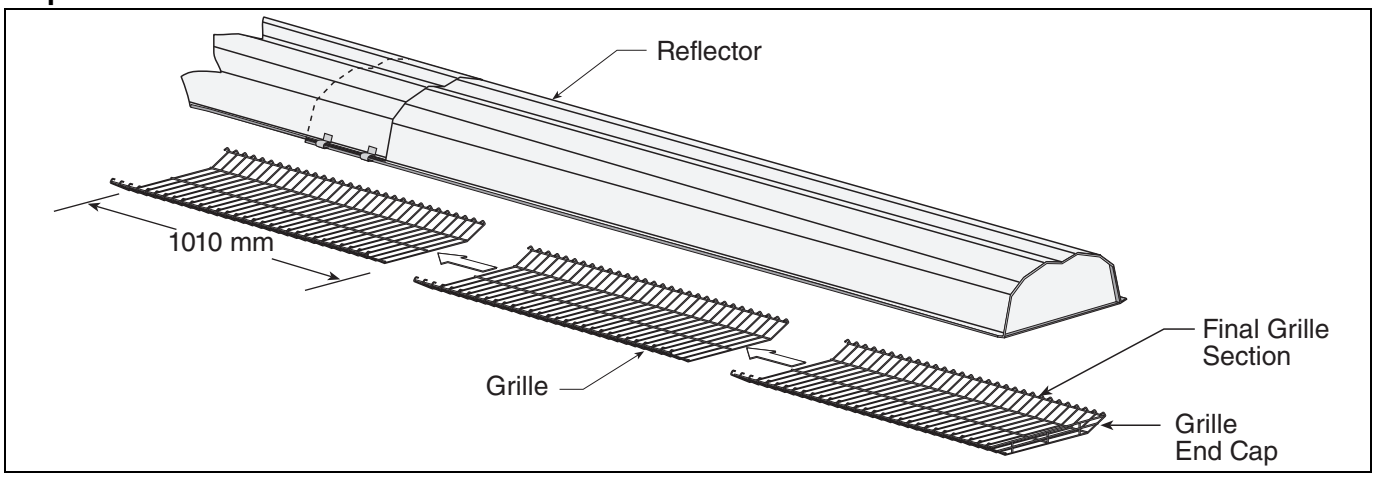


Description	Part Number
Grille Section	08050001
Grille End Cap	08050002
Silicone Cap	91915951-6P

Step 7.5.2 Grille End Cap Installation

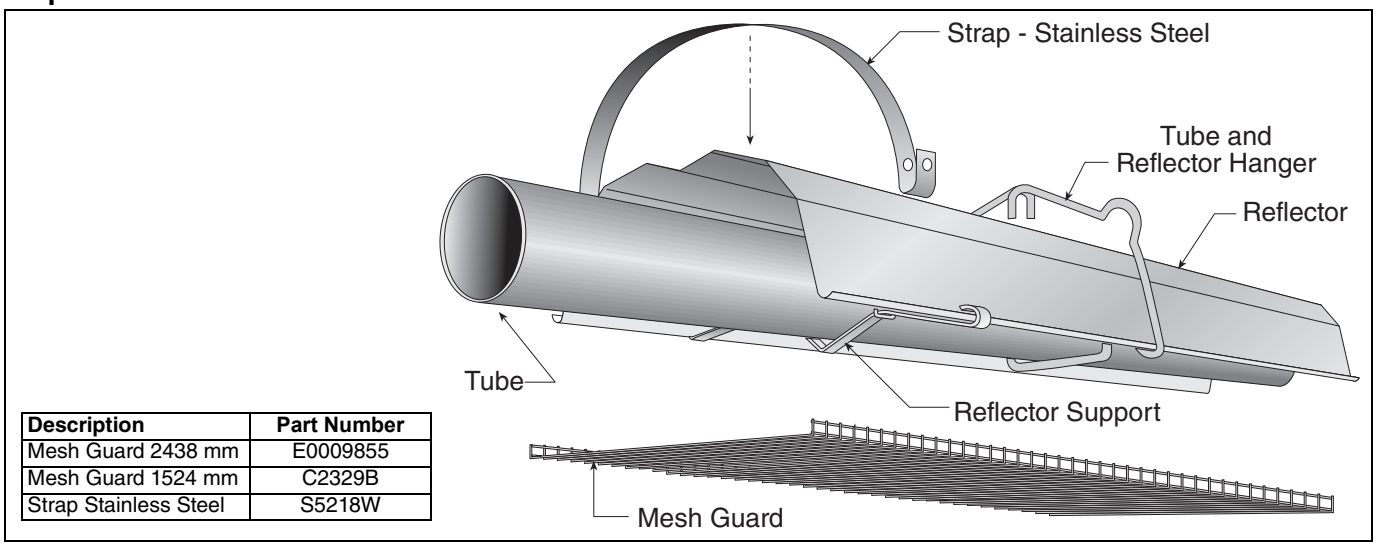


Step 7.5.3 Grille Installation



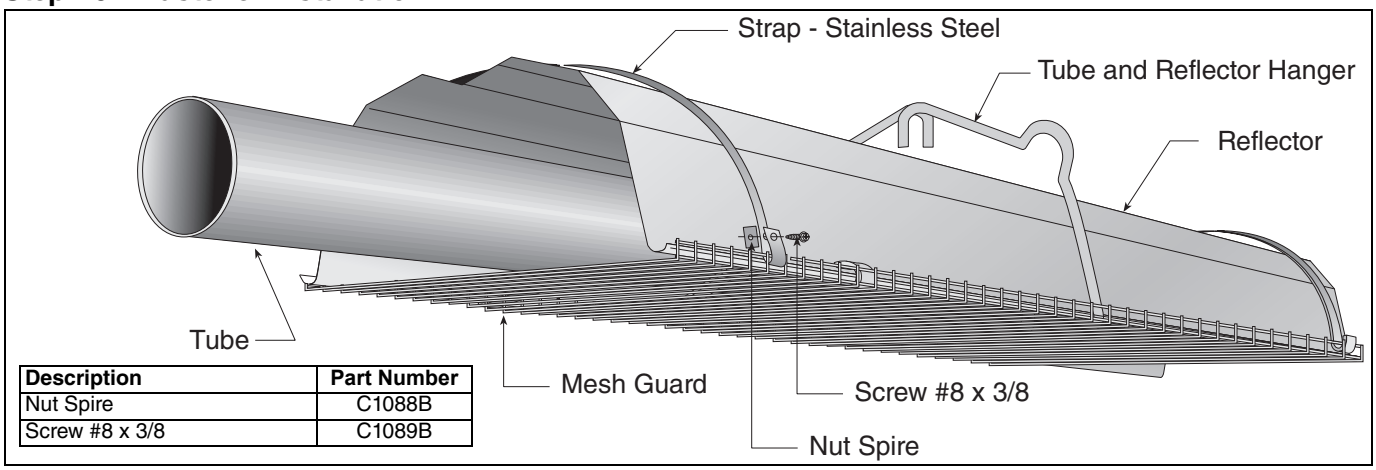
7.6 Sports Hall Guard Installation

Step 7.6.1 Grille Installation



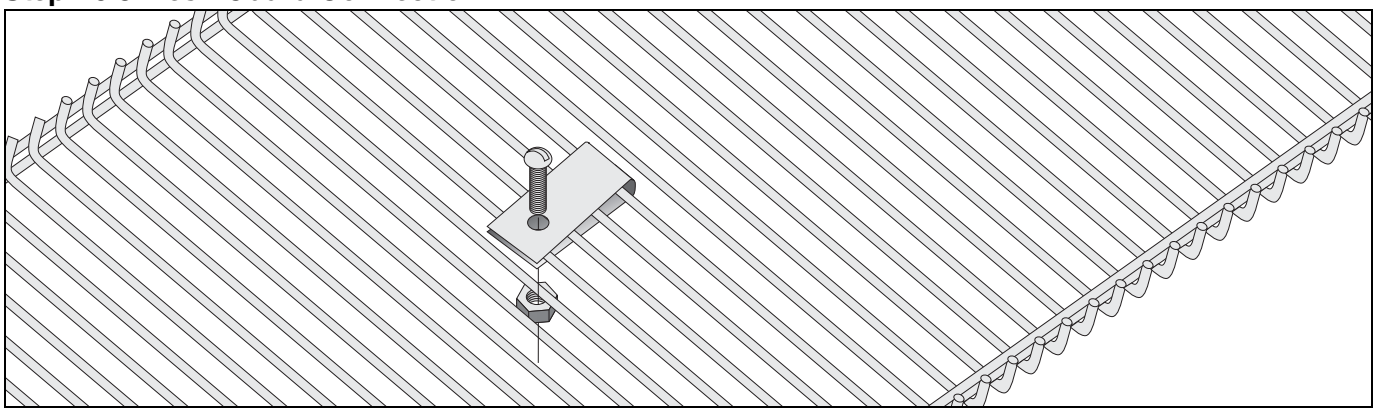
Description	Part Number
Mesh Guard 2438 mm	E0009855
Mesh Guard 1524 mm	C2329B
Strap Stainless Steel	S5218W

Step 7.6.2 Fastener Installation



Description	Part Number
Nut Spire	C1088B
Screw #8 x 3/8	C1089B

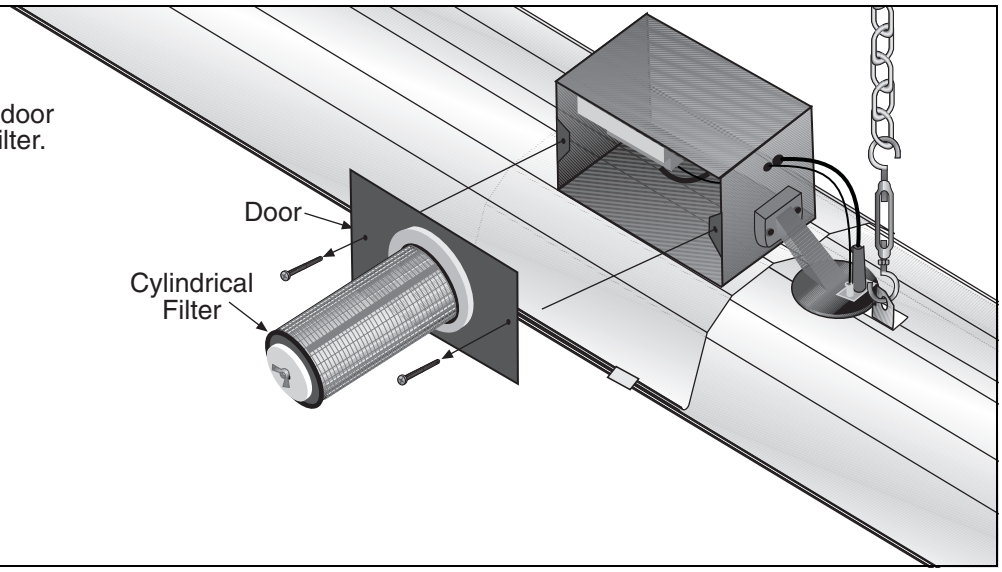
Step 7.6.3 Mesh Guard Connection



7.7 Sports Hall Filter

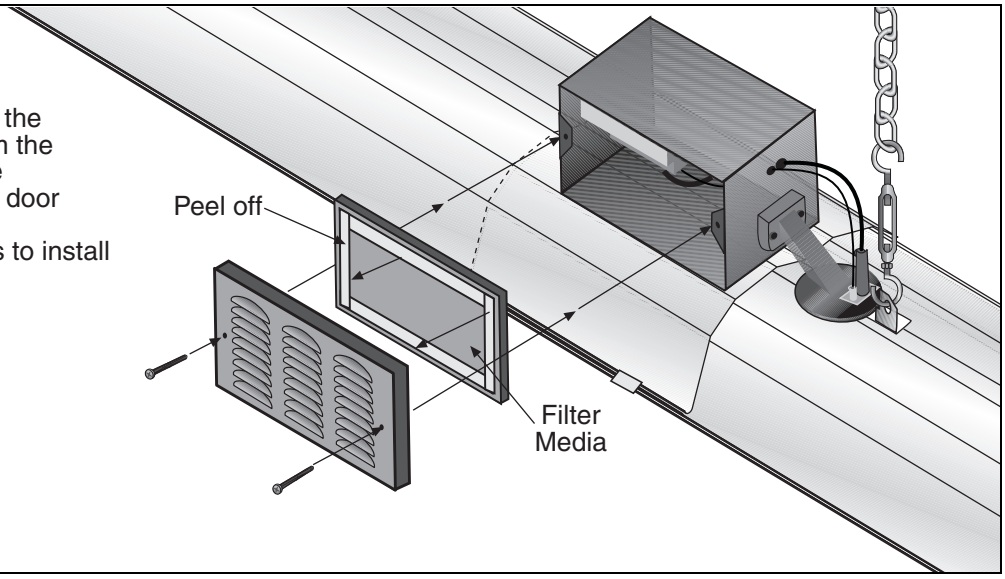
Step 7.7.1 Remove Standard Door

Remove the burner door with the cylindrical filter.



Step 7.7.2 Install New Door Filter

Remove backing of the adhesive strips from the filter and affix to the inside of the burner door with louvers.
Use existing screws to install new filter door.



SECTION 8: GENERAL VENTING REQUIREMENTS FOR PUMPS

⚠WARNING

Carbon Monoxide Hazard

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

Heaters must be installed according to the installation manual.

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

⚠WARNING

Cut/Pinch Hazard

Wear protective gear during installation, operation and service.

Edges are sharp.

Failure to follow these instructions can result in injury.

8.1 Venting Requirements

All venting must conform with national and local codes.
Any portion of vent pipe passing through a combustible wall must have an approved thimble to conform with national and local codes.

Vent pipe must be sloped downward away from the pump 6 mm every 3048 mm.

The bottom of the vent or air intake terminal shall not be located less than 304 mm above grade level.

The vent shall not terminate less than 2100 mm above grade where located adjacent to public walkways.

Vent terminal must be installed at a height sufficient to prevent blockage by snow, and building materials protected from degradation by flue gases.

Secure all joints with #8 x 3/8 sheet metal screws.

Seal all joints with high temperature silicone sealant. Vent terminal must be beyond any combustible overhang.

8.1.1 Vertical Venting

See Page 33, Figure 20 for recommended vertical venting options.

8.1.2 Horizontal Venting

See Page 32, Figure 19 for recommended horizontal venting options.

8.2 Mounting Wall Bracket Assembly

⚠WARNING

Crush Hazard

Mount pump with materials with a minimum working load of 181 kg.

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

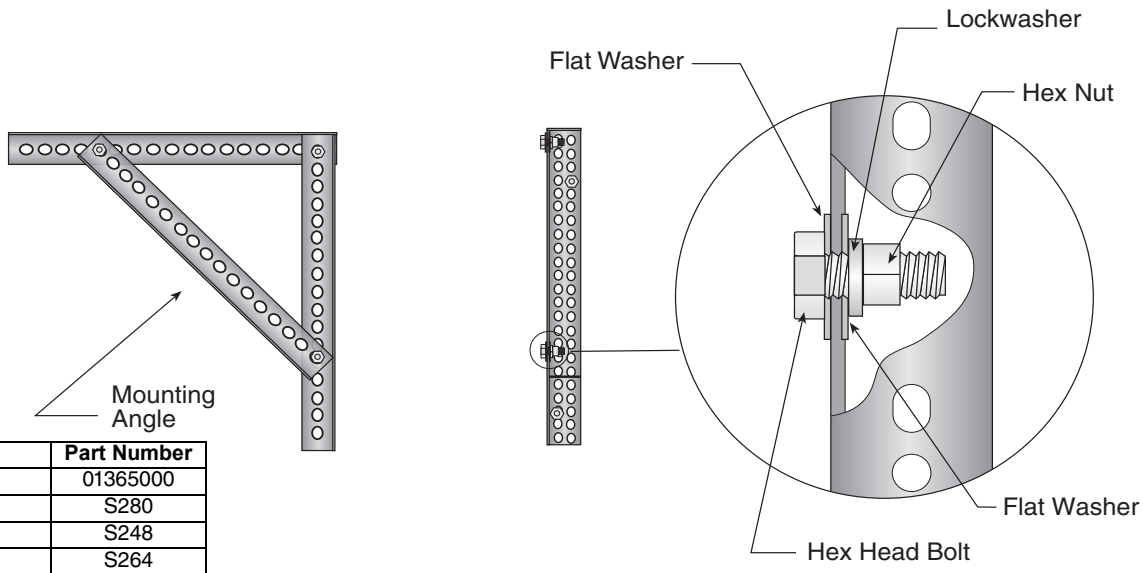
The pump may be mounted by using mounting angles as shown in *Figure 13 and Figure 14*. The two mounting angles form a mounting platform to which the pump will be attached using the anti-vibration mounts.

Fix the mounting frame to the wall using anchors. Select an anchor that will give equal to or greater than 907 kg (2000 lbs) ultimate pull-out strength.

8.2.1 Mounting Platform

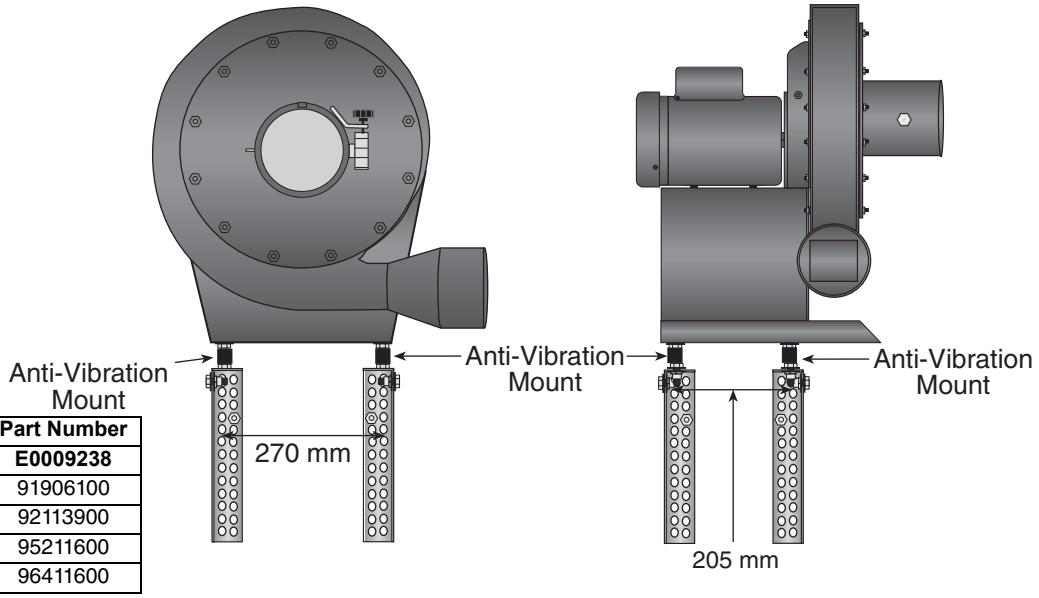
The standard method of mounting the RG-30 and RG-45 pump is on an outside wall and venting directly through the wall or roof.

Figure 13: Wall Bracket Assembly



Description	Part Number
Mounting Angle	01365000
Bolt M8 x 25 mm	S280
Nut M8	S248
Washer	S264
Lockwasher	S260

Figure 14: Mounting Platform Options



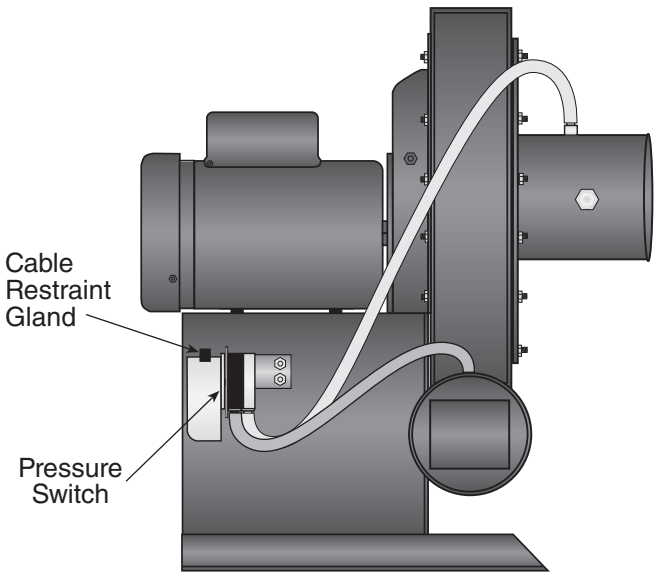
Description	Part Number
Anti Vibration Mounting Kit	**E0009238**
Anti Vibration Mount	91906100
Hex Nut	92113900
Washer	95211600
Lockwasher	96411600

8.2.2 Attaching Pressure Switch

Drill two holes in the fan base housing to accept the pressure switch mounting bracket and attach the switch by means of 2 self-tapping screws. The switch should be mounted vertically with the cable restraint gland on top.

The silicone tubing is installed according to *Figure 15*. Care must be taken that the tubing cannot kink or be squeezed together.

Figure 15: Pressure Switch Installation



Description	Part Number
Pressure Switch	E0007074

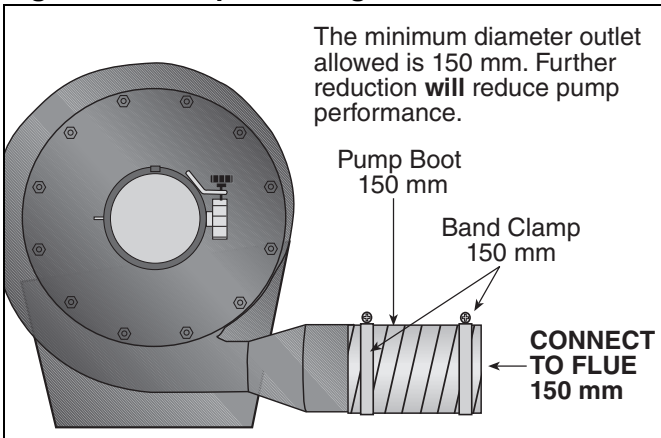
8.2.3 Flue Installation

The fan outlet must always discharge horizontally. Mount the 150 mm pump boot to the pump outlet using the150 mm band clamp provided. *See Figure 16*.

Connection should be made using 150 mm minimum diameter aluminium or stainless steel flue material. All flue material must conform to the relevant National Standards.

Mount the 150 mm flue to the pump boot securing it with the 150 mm band clamp. The flue length must not exceed 15,000 mm including 2 x 45° offset bands. The flue must be self supporting.

Figure 16: Pump Discharge Side



Description	Part Number
Pump Boot 150 mm	91412802
Band Clamp 150 mm	91913703

8.2.4 Pump Inlet Adapter for 100 mm (4") Tubing

Apply a bead of silicone sealant 316° C to the 150 mm inside of the reducer 150 mm x 100 mm. Mount the reducer to the inlet of the pump scroll using the 3 - #10 self drilling screws provided. *See Figure 17*.

IMPORTANT: To prevent leakage of condensate, do not install screws at the 6 o'clock position.

Mount the pump boot to the inlet reducer using the band clamp provided. *See Figure 17*.

8.2.5 Pump Inlet for 150 mm Tubing

Attach 150 mm pump boot to the inlet *See Figure 18*, then *See Page 30, Section 8.2.3*.

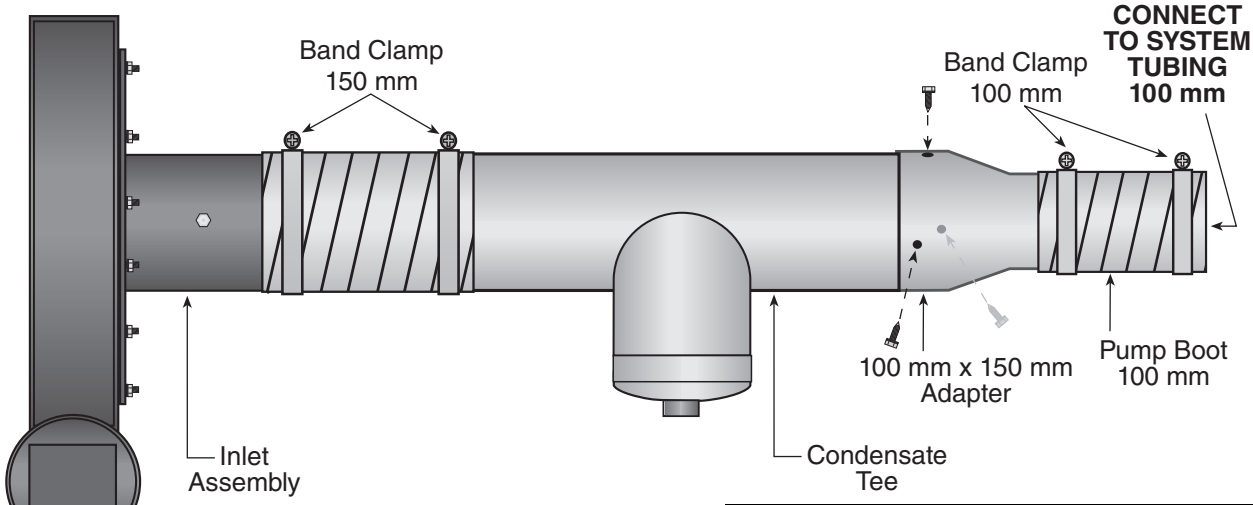
8.3 Building Ventilation

The space containing the heaters must have a permanent outside air vent with a minimum effective area of 4.5 cm^2 per kW of heat input. If mechanical ventilation is employed, the minimum proven airflow rate shall be 2.35 m^3/h per kW of heat input.

8.4 Ventilation Requirements

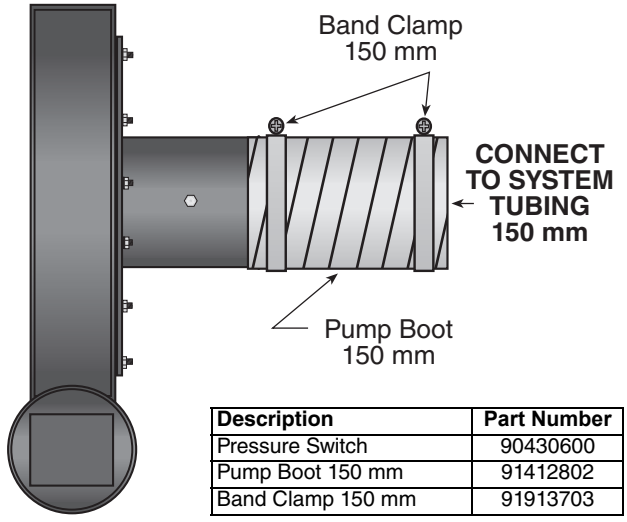
Detailed recommendations for air supply are given in the relevant National Standards. There must be an adequate supply of air for both combustion and general ventilation. Air vents should have negligible resistance. Do not locate air vents where they can be easily blocked or flooded, or adjacent to any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

Figure 17: Pump Inlet Side 100 mm



Description	Part Number
Pressure Switch	90430600
Pump Boot 100 mm	91412800
Band Clamp 100 mm	91901300
Inlet Assembly	90713454
101 mm x 150 mm Adapter	02719903

Figure 18: Pump Inlet Side 150 mm



Description	Part Number
Pressure Switch	90430600
Pump Boot 150 mm	91412802
Band Clamp 150 mm	91913703

8.5 Condensate Drain Assembly

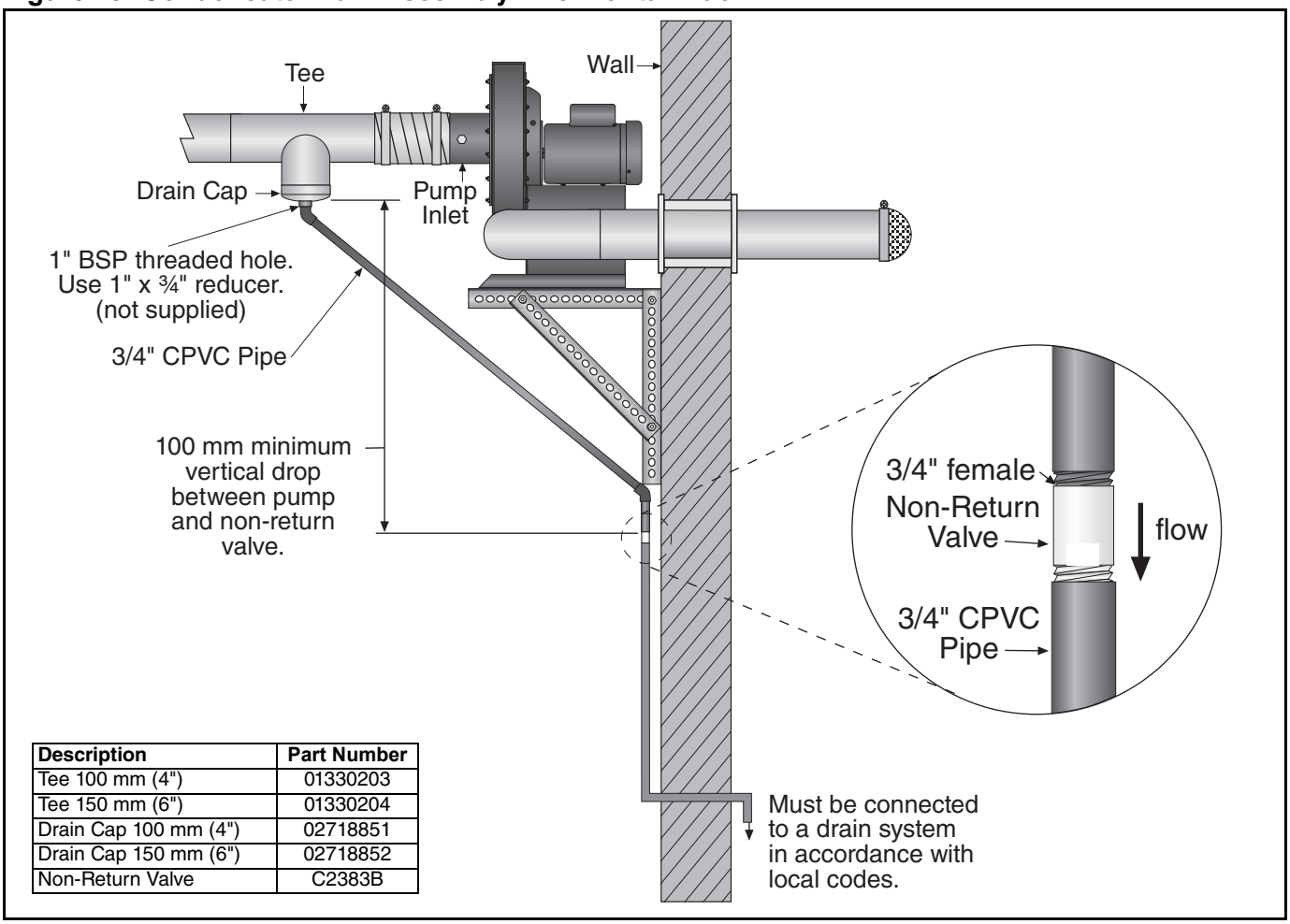
The condensate drain assembly is composed of a tee, draincap, and a non return valve.

A condensate drain assembly must be installed on the inlet side of the pump assembly if there is horizontal venting of the pump, *See Figure 19*.

A seperate condensate drain on the pump discharge side is required if there is vertical venting of the pump or if there is a vertical rise in the discharge line away from the pump. *See Page 33, Figure 20*.

The condensate drain assembly in the pump discharge line can be eliminated if the discharge line is horizontal through the wall and pitched down at least 6 mm per 3048 mm. This arrangement will permit drainage of condensate through the pump and outside via the horizontal (pitched) discharge line.

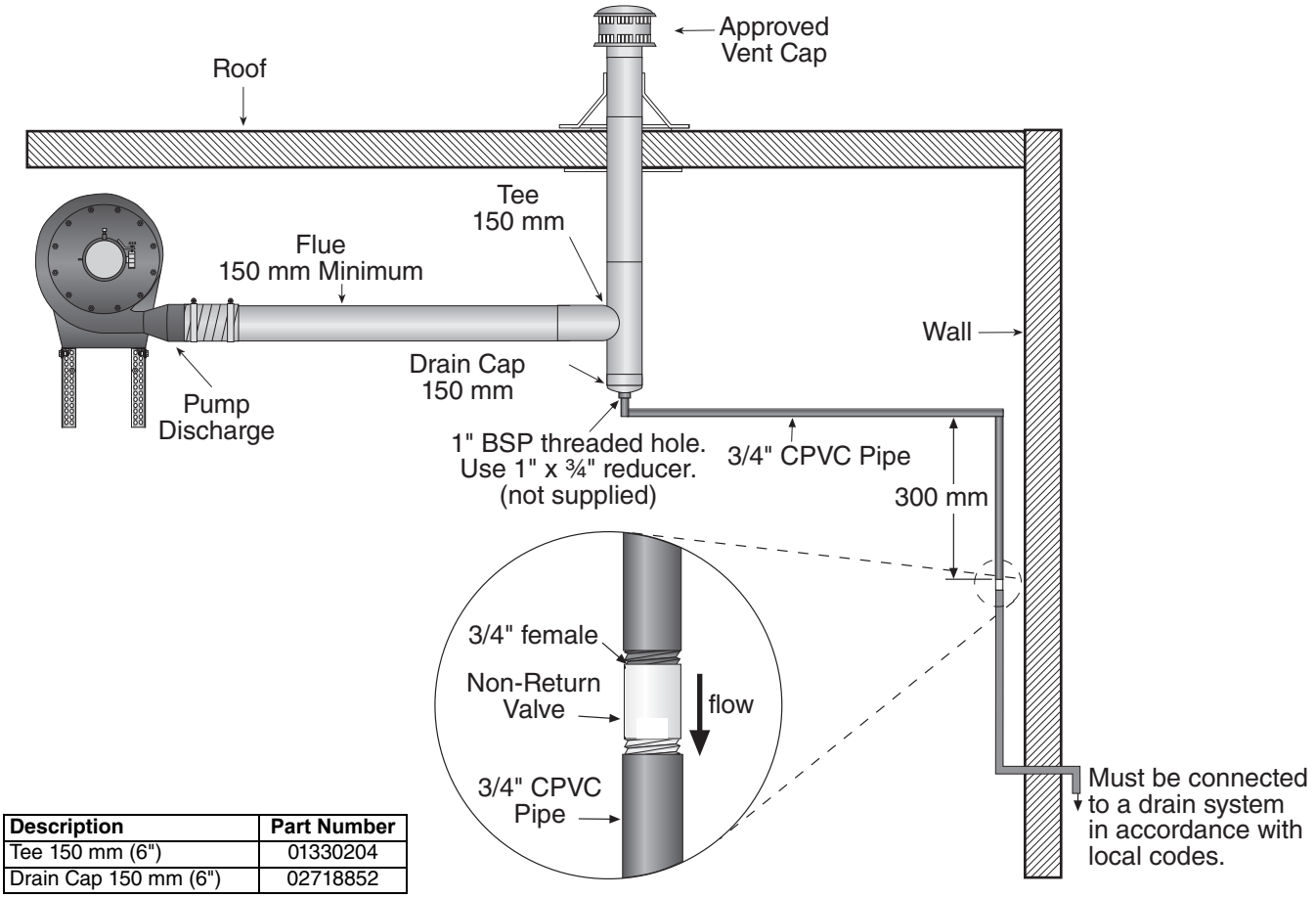
Figure 19: Condensate Drain Assembly - Horizontal Flue



Description	Part Number
Tee 100 mm (4")	01330203
Tee 150 mm (6")	01330204
Drain Cap 100 mm (4")	02718851
Drain Cap 150 mm (6")	02718852
Non-Return Valve	C2383B

Part Number	Description	Part Number	Description
01330203	Tee, 4" (100 mm) Aluminized	91409403	Tube, Aluminized 4" (100 mm) dia. 10' (3 m)
01330204	Tee, 6" (150 mm) Aluminized	91409420	Tube, Aluminized 6" (150 mm) dia. 10' (3 m)
01331900	Damper Coupling, 4" (100 mm)	91412800	Flexible Boot, 4" (100 mm)
01335801	Elbow, 4" (100 mm) Aluminized 90°	91412801	4 - Flexible Boot, 1/2" (13 mm)
02718851	Drain Cap, 4" (100 mm)	91412802	Flexible Boot, 6" (150 mm)
02718852	Drain Cap Assembly, 6" (150 mm)	91901300	Boot Clamp, 4" (100 mm)
90502300	Vent Cap, 4" (100 mm) Metalbestos	91913703	Boot Clamp, 6" (150 mm)
90502302	Vent Cap, 6" (150 mm) Metalbestos	E0009356	Damper Coupling, 6" (150 mm)
T0100320	Elbow, 6" (150 mm) Aluminized 90°		

Figure 20: Condensate Drain Assembly - Vertical Flue

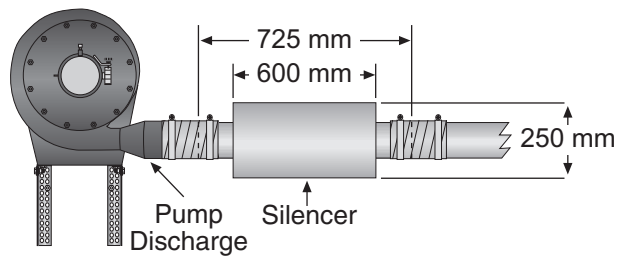


Description	Part Number
Tee 150 mm (6")	01330204
Drain Cap 150 mm (6")	02718852

Part Number	Description	Part Number	Description
01330203	Tee, 4" (100 mm) Aluminized	91409403	Tube, Aluminized 4" (100 mm) dia. 10' (3 m)
01330204	Tee, 6" (150 mm) Aluminized	91409420	Tube, Aluminized 6" (150 mm) dia. 10' (3 m)
01331900	Damper Coupling, 4" (100 mm)	91412800	Flexible Boot, 4" (100 mm)
01335801	Elbow, 4" (100 mm) Aluminized 90°	91412801	4 - Flexible Boot, 1/2" (13 mm)
02718851	Drain Cap, 4" (100 mm)	91412802	Flexible Boot, 6" (150 mm)
02718852	Drain Cap Assembly, 6" (150 mm)	91901300	Boot Clamp, 4" (100 mm)
90502300	Vent Cap, 4" (100 mm) Metalbestos	91913703	Boot Clamp, 6" (150 mm)
90502302	Vent Cap, 6" (150 mm) Metalbestos	E0009356	Damper Coupling, 6" (150 mm)
T0100320	Elbow, 6" (150 mm) Aluminized 90°		

8.6 Acoustic Enclosure (Optional)

The acoustic enclosure is used to reduce noise from the pump installed inside the building. The enclosure can also be used as a weatherproof enclosure if the pump is installed outside. For outside applications a master flash must be attached over the tail pipe and flue discharge connection. In some applications the noise from the pump discharge needs to be reduced. A silencer attached to the discharge side must be used. *See Figure 21*.



Description	Part Number
Silencer	C0996B

Figure 21: Silencer

The acoustic enclosure comes fully assembled with

an electrical junction box on its side. Pressure switch control wires and electrical power connection need to be connected here. A wiring diagram is inside the junction box. *See Figure 22*.

The mounting of the enclosure must be done as described in *Section 8.2 on Page 29*.

Figure 22: Acoustic Enclosure

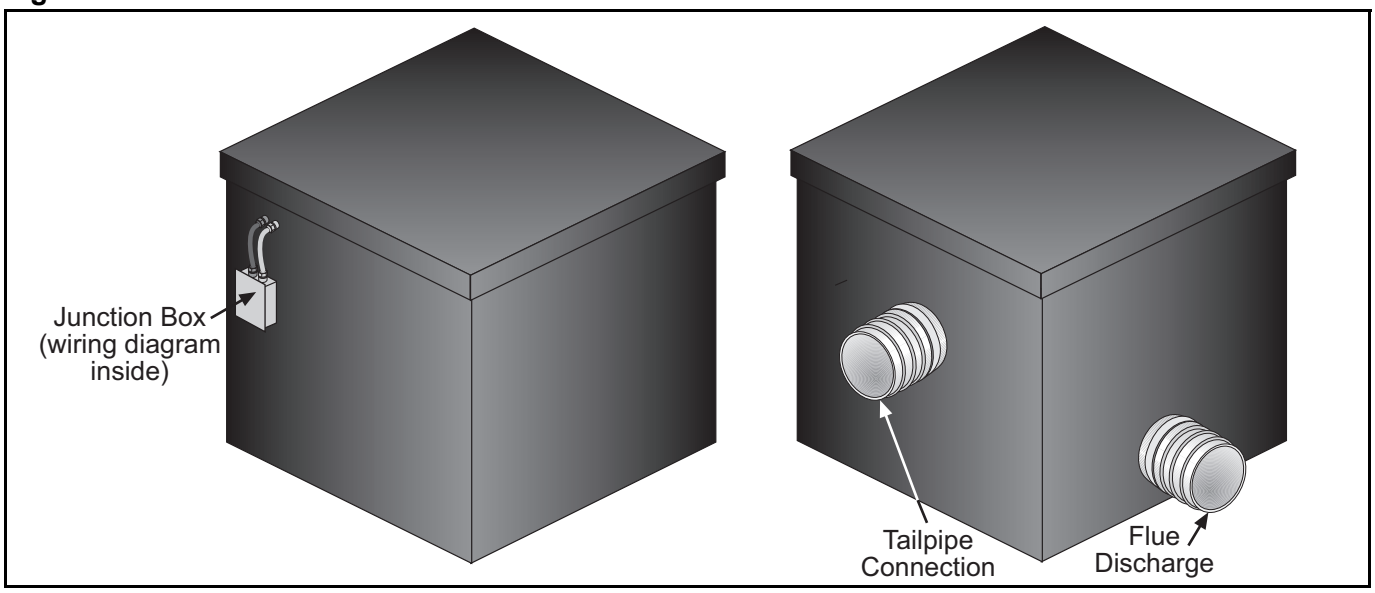


Figure 23: Junction Box Wiring Diagrams

3 Ø Motors

From Pressure Switch		From Fan Motor			
Blue	Brown	Brown	Black	Blue	Earth
Common	NO	U1	V1	W1	

1 Ø Motors

From Pressure Switch		From Fan Motor			
Blue	Brown		Brown	Blue	Earth
Common	NO				

8.6.1 Noise Data

All noise data has been determined according to EN ISO 3746:1995, survey method "Parallelepiped measurement surface". Values given below are at 3 m distance from the object.

RG30 and RG45 Pump Data	Sound Pressure Level dB (A)	NR
No acoustic enclosure	59	53
No acoustic enclosure with 600 mm silencer	59	53
With acoustic enclosure	57	51
With acoustic enclosure and 600 mm silencer	55	49
Flue Data		
Straight outlet duct	69	63
Straight outlet duct with 600 mm silencer	60	54
Burner Data		
CRT 10 - 30 located at end vent plate	58	52
CRT 10 - 30 located in middle of branch	49	43

SECTION 9: OUTSIDE AIR SUPPLY

The CORAYVAC® system is approved for use with an outside air system. Halogenated hydrocarbons or other corrosive chemicals in the air can be drawn into the equipment and seriously damage the system components. Avoid the use of such chemical compounds near the air inlet to the heaters.

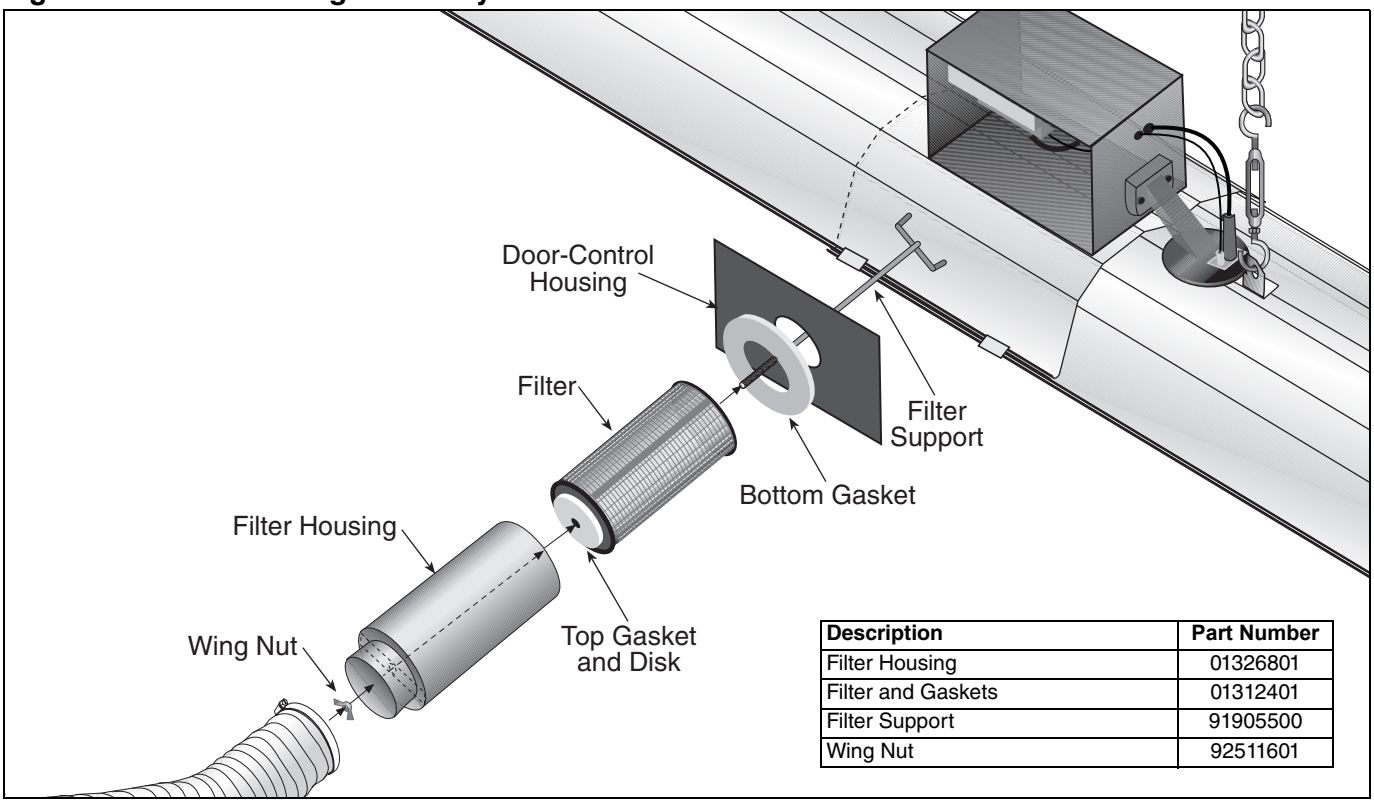
IMPORTANT: If the building has a slight negative pressure or contaminants are present in the air, an outside combustion air supply to the heaters is strongly recommended.

All joints and seams in the air supply system must be airtight. The filter housing attaches to the burner assembly by using the wing nut provided. Single wall pipe duct may be attached to the burner and end vent.

Duct Design Rules:

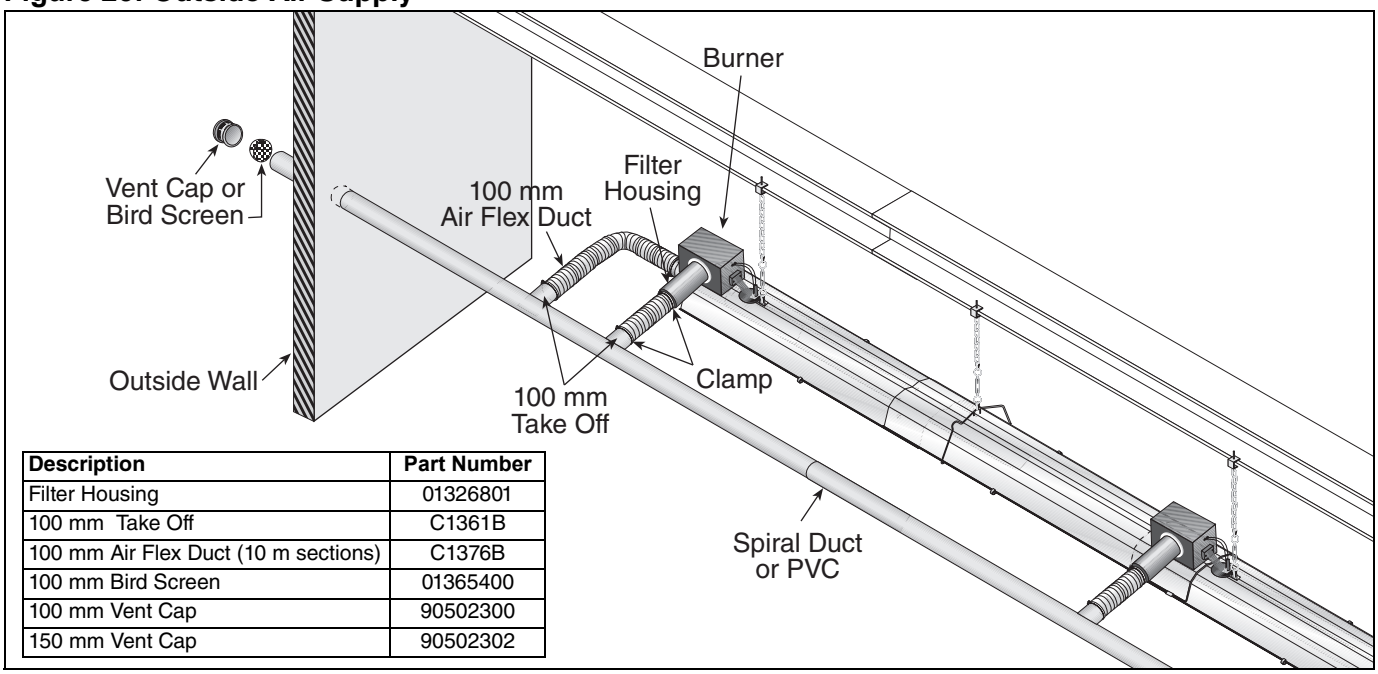
- 150 mm (6") diameter duct must not exceed 27 m (90') maximum 30 flow units.
- 100 mm (4") diameter ductmust not exceed 27 m (90') maximum 12 flow units.
- Elbows are equivalent to 3 m (10') of duct length.

Figure 24: Filter Housing Assembly



Description	Part Number
Filter Housing	01326801
Filter and Gaskets	01312401
Filter Support	91905500
Wing Nut	92511601

Figure 25: Outside Air Supply



Description	Part Number
Filter Housing	01326801
100 mm Take Off	C1361B
100 mm Air Flex Duct (10 m sections)	C1376B
100 mm Bird Screen	01365400
100 mm Vent Cap	90502300
150 mm Vent Cap	90502302

SECTION 10: GAS PIPING

⚠WARNING

Fire Hazard

Tighten gas line fittings to connect gas supply according to Figure 26.

Flex gas line can crack when twisted.

Gas line moves during normal operation.

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

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

⚠WARNING

Explosion Hazard

Leak test all components of gas piping before operation.

Gas can leak if piping is not installed properly.

Do not high pressure test gas piping with heater connected.

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

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

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

Install the gas hose as shown *on Page 37, Figure 26*. The gas hose accommodates expansion of the heating system and allows for easy installation and service of the burner. Before connecting the burners to the supply system, verify that all high pressure testing of the gas piping has been completed.

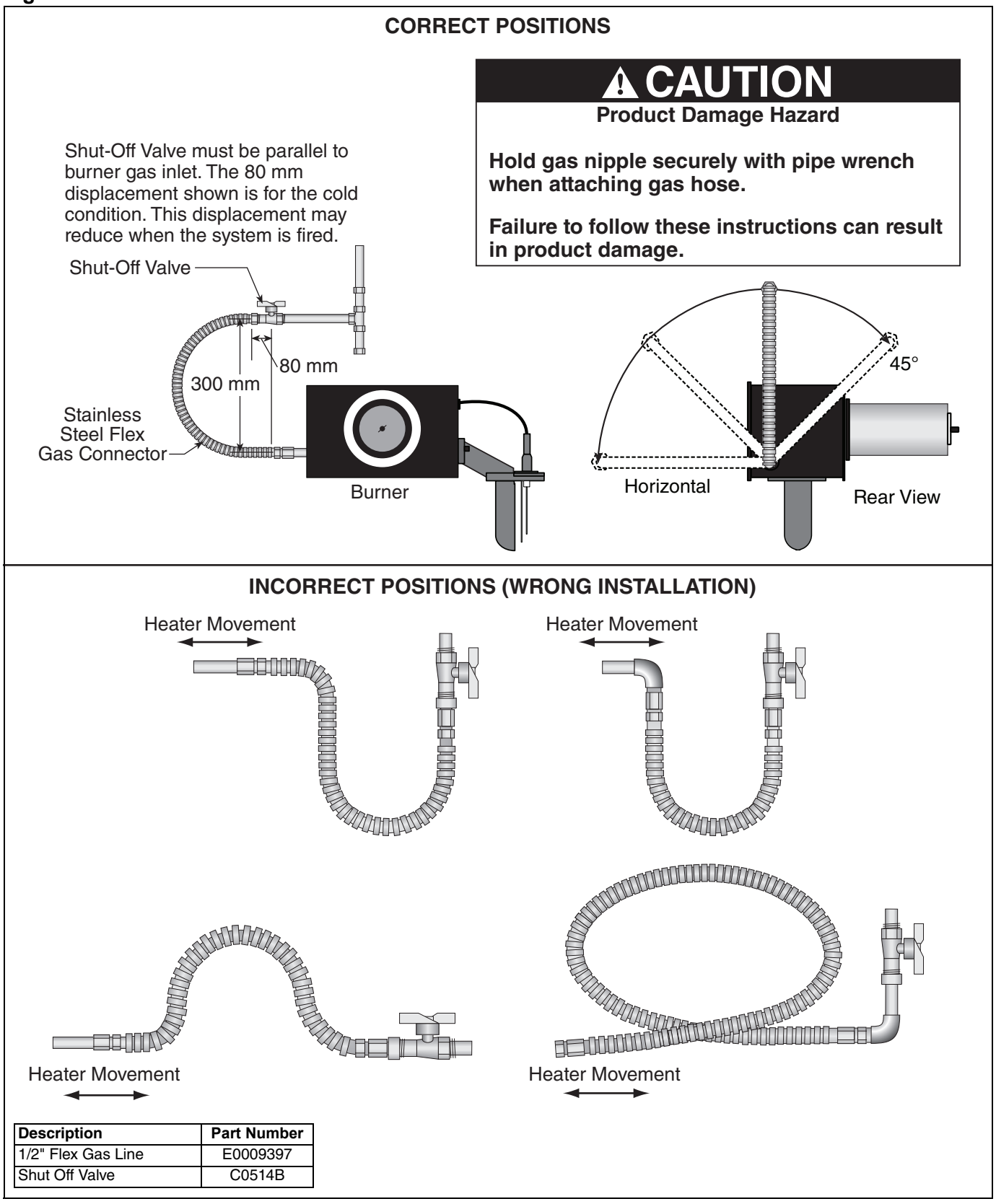
There is an expansion of the tube with each firing cycle. This will cause the burner to move with respect to the gas hose. This can cause a gas leak resulting in an unsafe condition if the gas connection is not made in strict accordance with *Figure 26*.

Meter and service must be large enough to handle all the burners being installed plus any other connected load. The gas hose which feeds the system must be large enough to supply the required gas with a maximum pressure drop of 1.5 mbar. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping.

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

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

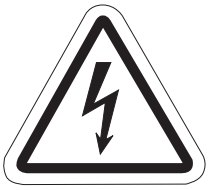
Figure 26: Gas Connection with Stainless Steel Flex Gas Connector



Description	Part Number
1/2" Flex Gas Line	E0009397
Shut Off Valve	C0514B

SECTION 11: WIRING

⚠ 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.

Connect to the electrical supply using a 3 pin plug via a locally mounted double pole fused switch having a minimum disconnection of 3 mm on each pole. The burner is fused at 1 A. There are no control connections in the standard burner. Control is effected by interruption of the main power inlet. *See Figure 27* for external *and Page 39, Figure 28* for internal wiring.

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

3 phase motors can be reversed by interchanging 2 phase connections.

The control of the CORAYVAC® system must via a Roberts-Gordon Europe Limited approved control to ensure that the necessary safety systems are in place and proper post purge occurs at close down.

Figure 27: External System Wiring

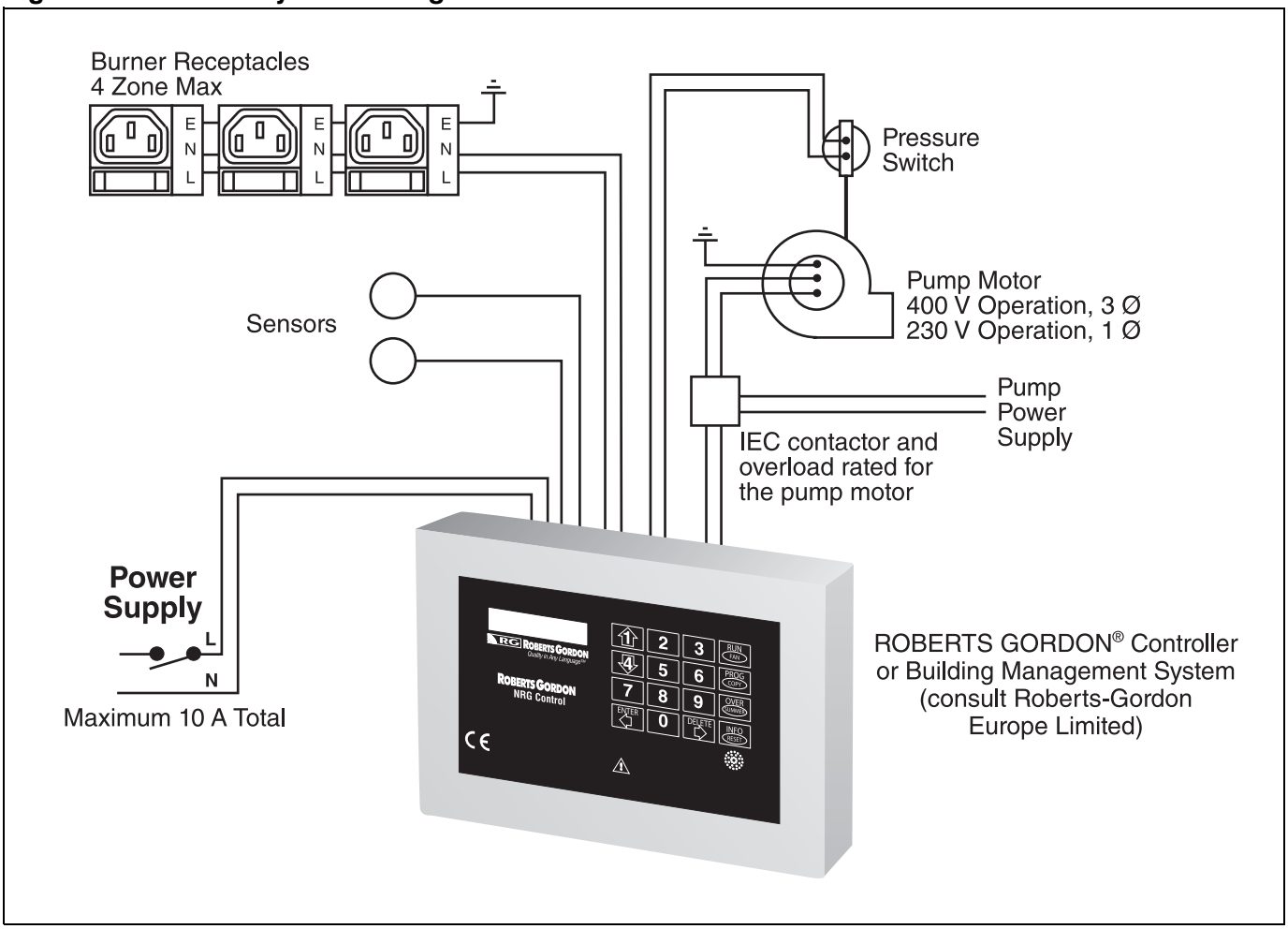
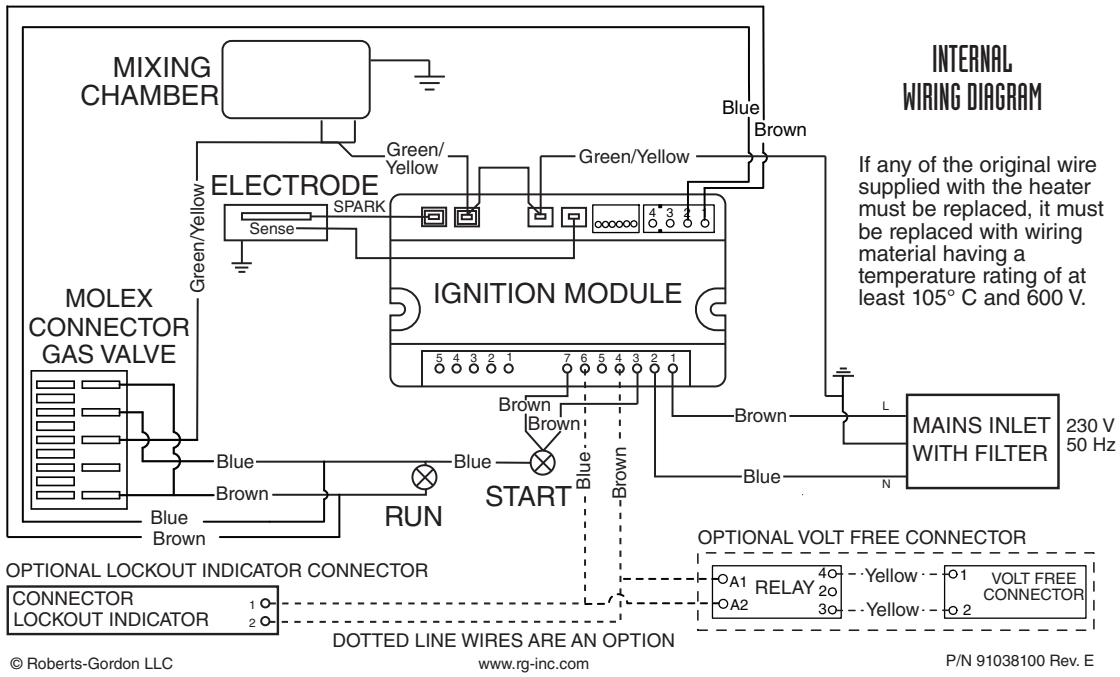


Figure 28: CRT Burner Internal Wiring



If any of the original wire as 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 V.

SECTION 12: OPERATION AND MAINTENANCE

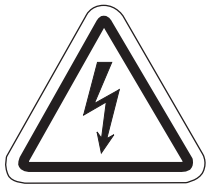
⚠ DANGER	⚠ WARNING		
			
Electrical Shock Hazard **Disconnect electric before service.** **More than one disconnect switch may be required to disconnect electric from heater.** **Heater must be connected to a properly grounded electrical source.**	**Explosion Hazard** **Turn off gas supply to heater 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.			

Figure 29: CORAYVAC® System Sequence of Operation Chart

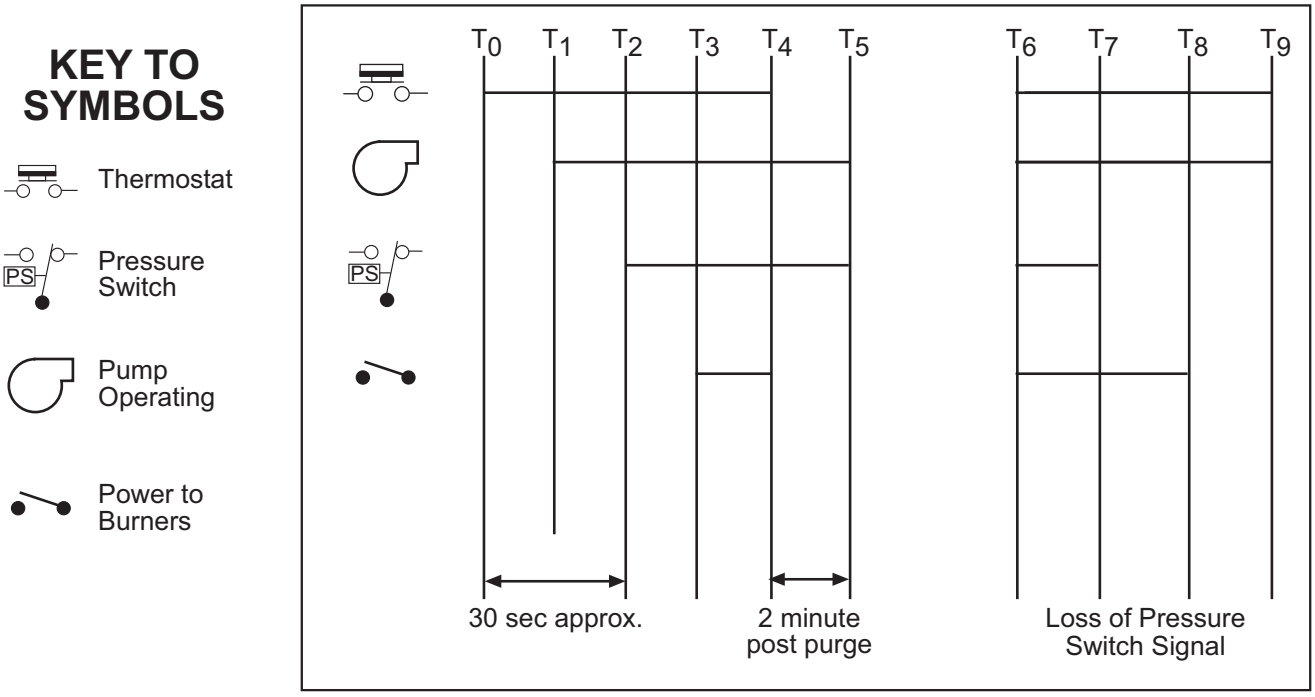
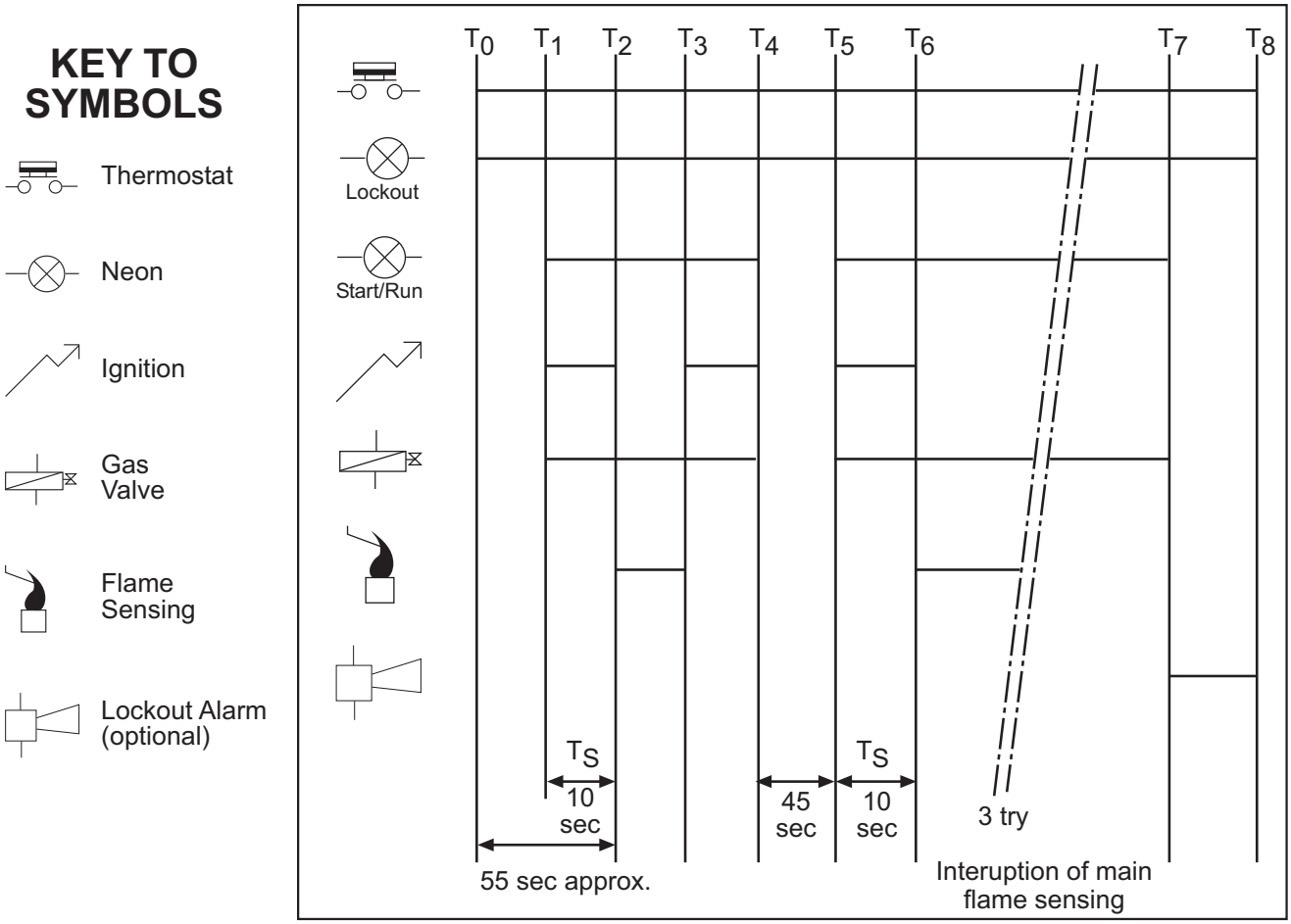


Figure 30: Burner Sequence of Operation Chart



12.1 Sequence of Operation

On connection of the power supply, the pump will start creating a suction in the tube. The pressure switch at the pump will change contacts when suction is created. A pre-purge cycle which lasts 30 seconds is initiated. Once complete, power to the burners is enabled.

The burner sequence begins with the red lockout neon illuminated. This indicates that the burner has begun the ignition sequence.

Power to the burner sequence controller initiates an approximate 45 second purge period. Following the purge period, the solenoid valve opens. This allows the vacuum, created in the tube, to lift the diaphragm in the zero governor thereby allowing the passage of gas to the burner. At the same time, a spark is created and ignition should take place. If ignition of the gas is not successful, the spark will cease and the solenoid will close after approximately 10 seconds. The ignition sequence is repeated for 2 more times before lockout occurs. The lockout neon will remain lit indicating the condition. When the gas is ignited, the detection circuit is energised and switches off the ignition circuit. The run neon (green) will illuminate indicating full running condition.

The system will continue to run until the power supply or gas supply is interrupted. Interruption of the electrical supply results in shutdown of the burners, after which, the pump will continue to run for two minutes to clear products of combustion from the system. Restoration will restart the whole sequence. Interruption of the gas supply will result in loss of flame followed by 3 attempts to reignite, if unsuccessful, lockout occurs. *See Page 41, Figure 30* for alarm sequence.

12.2 Heater Lockout Indication

In case of flame loss during operation of the heater, the burner control unit goes to lockout mode after three ignition trials. At this stage a 230 V signal is provided which enables the ROBERTS GORDON® controller, BMS sytem, etc. to indicate precisely which heater has failed. If your heater is equipped with "Heater Lockout" indication, an additional wire has to be installed from the heater's lockout indicator connector to the monitoring computer.

12.3 Commissioning and Testing

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

1. Establish that a satisfactory purged gas supply and an electrical supply is available to the heater.

2. Ensure that all dampers are in the fully open position.
3. Turn off the electrical supply to the heaters.
4. Switch on the electrical supply at the main isolator. This will start the exhaust fan.
5. Ensure that all time clocks and thermostats are set to call for heat.
6. **Balancing Cold Suction**
   Starting at the branch furthest from the pump, check the end vent vacuum. Do this by connecting a manometer by inserting the test probe a minimum of 150 mm into the hole. *See Page 49, Figure 31*. Adjust the damper at the end of the radiant run so that the suction is approximately 9 mbar. Repeat for each branch.
7. Switch off the electrical supply at the main isolator. The exhaust fan will stop.
8. Turn on the electrical supply to the heater.
9. Switch on the electrical supply at the main isolator.
10. **Balancing Hot Suction**
    The start up sequence described *on Page 41, Section 12.1* should take place. Allow the system to reach full temperature (approximately 30 minutes). Set the dampers at each branch to achieve the settings for the installed burner model as listed in *12.3.1*.

12.3.1 Suction Settings

Model	Heat Input	Hot Suction all Gas Types (mbar)
CRT10	10 kW	5.7
CRT15	15 kW	6.5
CRT20	20 kW	7.0
CRT25	25 kW	6.7
CRT30	30 kW	7.0

Repeat this procedure for each branch of the system.

12.4 System Checks

Turn the system off and restart it to ensure smooth ignition. Carry out the following system checks.

1. When running, turn off the gas supply at the appliance isolating cock. The heater will immediately shut down followed by 3 attempts at restoration followed by lockout.
2. When running, disconnect the fan electrical supply. The burner should shut down within a few seconds proving operation of the pressure switch.
3. When running, turn down the thermostat to a point below room temperature. Check that the fan continues to run on for two minutes after shut down of the burners.

12.5 User Instructions

After satisfactory testing, ensure that the client is fully aware of the operation of the system. Bring this manual to the attention of the user or purchaser; instruct them in the safe operation of the heater(s).

12.6 ECA Approved Systems

On ECA approved systems, it must be verified that the requirement of 91% net combustion efficiency is met. Measurements of temperature and CO_2 concentration in the exhaust gasses have to be done. The net combustion efficiency calculates as follows;

$100 - [(t_E - t_R) (A/CO_{2m} - B)]$ = net comb. efficiency

t_E - Exhaust Temperature °C

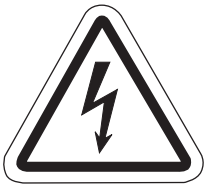
t_R - Room Temperature °C

A - G20 = 0.37, G31 = 0.42

B - G20 = 0.009, G31 = 0.008

CO_{2m} -Measured CO_2 Concentration %

SECTION 13: SERVICING INSTRUCTIONS

⚠ DANGER	⚠ WARNING		
			
Electrical Shock Hazard **Disconnect electric before service.** **More than one disconnect switch may be required to disconnect electric from heater.** **Heater must be connected to a properly 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.			

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

13.1 Annual Service Procedure

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

13.1.1 Burner Removal

Isolate the heater from the gas and electrical supplies. Remove the plug from the burner. Remove the two nuts that secure the burner head to the combustion chamber. The burner can now be removed.

13.1.2 Burner Maintenance

Remove the burner to the floor level and clean internally using a soft brush and compressed air if available. Take care not to damage the internal parts of the burner. When removing the burner, take care not to disturb the gasket on the combustion chamber. The electrode is an integral part of the burner head. Check that the spark gap is approximately 3 mm.

13.1.3 Tube and Reflector Maintenance

With the burner removed, clean the outer surfaces of the tubes using a brush and wipe the inner surface of the reflector with a soft damp cloth - use a household detergent if necessary. Never use abrasive cleaners on the reflectors. Reassemble the burner in reverse order. Carry out the Commissioning and Testing Procedure *on Page 41, Section 12.3*.

13.2 Component Removal

Isolate the heater from the gas and electrical supplies. Remove the plug from the burner. Entry to the burner assembly is gained by removing the two door screws and removing the side cover.

13.2.1 Electrode

13.2.2 The electrode is an integral part of the burner head. Check that the spark gap is approximately 3 mm. Remove the electrode cover and the two allen screws that secure the electrode to the burner head. Inspect the electrode gasket; replace as required.

13.2.3 Injector Jet

When the side cover is removed completely, the burner assembly is exposed. The jet is located in the mixing block behind the pipe plug. Remove brass injector jet (orifice). Replace in reverse sequence.

13.2.4 Solenoid Valve/Governor

Remove the electrode cover from the burner head and unplug spark and sensor leads. Remove burner head by unscrewing the two allen screws. Remove the tagged wires from the burner run neon. Remove the cross-head screw retaining the valve connection.

Withdraw the connection block. Remove the ground wire from the gas valve and from the air shutter screw. The gas train can now be withdrawn from the compartment. The gas train can now be dismantled. Replace part and reassemble in reverse order.
NOTE: When reassembling, a suitable sealant must be used to ensure that no gas leaks occur. Further to this, the assembly must be square so that all the components are upright.

13.2.5 Automatic Flame Control Unit

Remove ignition lead, sense wire and other connectors. Unscrew two screws from the cover. Replace if faulty. Refit in reverse sequence.

13.2.6 Neons

Remove the two push connectors from the neon. Remove the neons by depressing the retaining tabs inward. Replace in reverse sequence.

13.3 Maintenance Checklist

Installation Code and Annual Inspections:

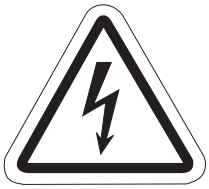
All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon Europe Limited and conform to all requirements set forth in the ROBERTS GORDON® manuals and all applicable governmental authorities pertaining to the installation, service and operation 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 vapours near the heating system. Immediately remove these items if they are present. *See Page 5, Section 3*.
Vehicles and Other Objects	Maintain the clearances to combustibles. Do not hang anything from, or place anything on, the heater. Make sure nothing is lodged underneath the reflector, in between the tubes or in the decorative or protective grilles (included with select models). Immediately remove objects in violation of the clearances to combustibles. *See Page 5, Section 3*.
Reflector	Support reflector with reflector hanger and support strap. Reflector must not touch tube. Make sure there is no dirt, sagging, cracking or distortion. Do not operate if there is sagging, cracking or distortion. Make sure reflectors are correctly overlapped. *See Page 18, Section 6.4.3*. Clean outside surface with a damp cloth.
Vent Pipe	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.
Outside Air Inlet	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.

Tubes	Make sure there are no cracks. Make sure tubes are connected and suspended securely. *See Page 14, Figure 11 through Page 16, Section 6.2.1*. Make sure there is no dirt, sagging, bending or distortion. Clean or replace as required.
Gas Line	Check for gas leaks. *See Page 37, Figure 26*.
Combustion Chamber Window	Make sure it is clean and free of cracks or holes. Clean or replace as required.
Burner Head and Orifice	Clear of obstructions (even spider webs will cause problems). Carefully remove any dust and debris from the burner.
Electrode	Replace if there are cracked ceramics, excessive carbon residue, or erosion of the electrode. The electrode gap should be 1/8” (3 mm).
Thermostat	There should be no exposed wire or damage to the thermostat.
Suspension Points	Make sure the heater is hanging securely. The chains must hang vertical. Look for signs of wear on the chain or ceiling. *See Page 14, Figure 11*.
Protective Grille (optional)	The grille must be securely attached. *See Page 25, Section 7.5 through Page 25, Section 7.5.3*.
Pump	With pump operating, check for excessive vibration or noise. Vibration is usually a sign that the impeller is out of balance. Turn off the system, insure power is shut off and remove the inlet plate. Check the shaft seal and replace it if worn or missing. **With the Power off:** Check the inlet and outlet of the pump for blockage or excessive soot and clean as necessary. Check boots for cracking or deterioration and replace if necessary. If a condensate drain is installed, check the condition of the drain and the non return valve attached. Check the condition of the motor anti vibration mounts. Lift the motor from the rear; look for breaks in the rubber and replace if necessary. Check the condition and operation of the pressure switch.
Wall Tag	If a 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. *See Page 4, Section 2.1*.

SECTION 14: TROUBLESHOOTING

⚠ DANGER



Electrical Shock Hazard

Disconnect electric before service.

Heater must be properly grounded.

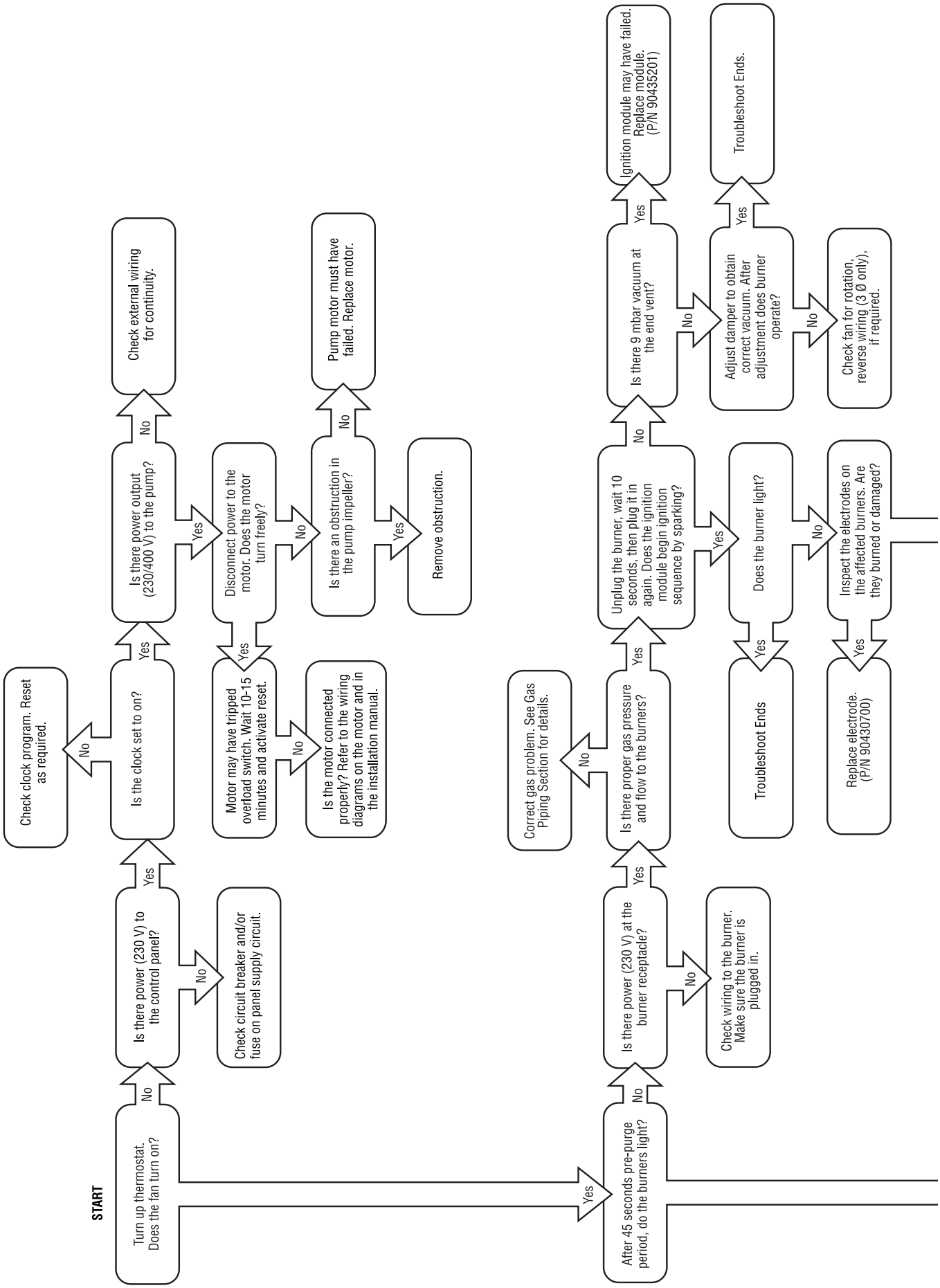
Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING

			
Fire Hazard	**Explosion Hazard**	**Burn Hazard**	**Cut/Pinch 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.**	**Turn off gas supply to heater before service.**	**Allow heater to cool before service.** **Tubing may still be hot after operation.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**

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

14.1 Troubleshooting Flow Chart



Troubleshooting Flow Chart

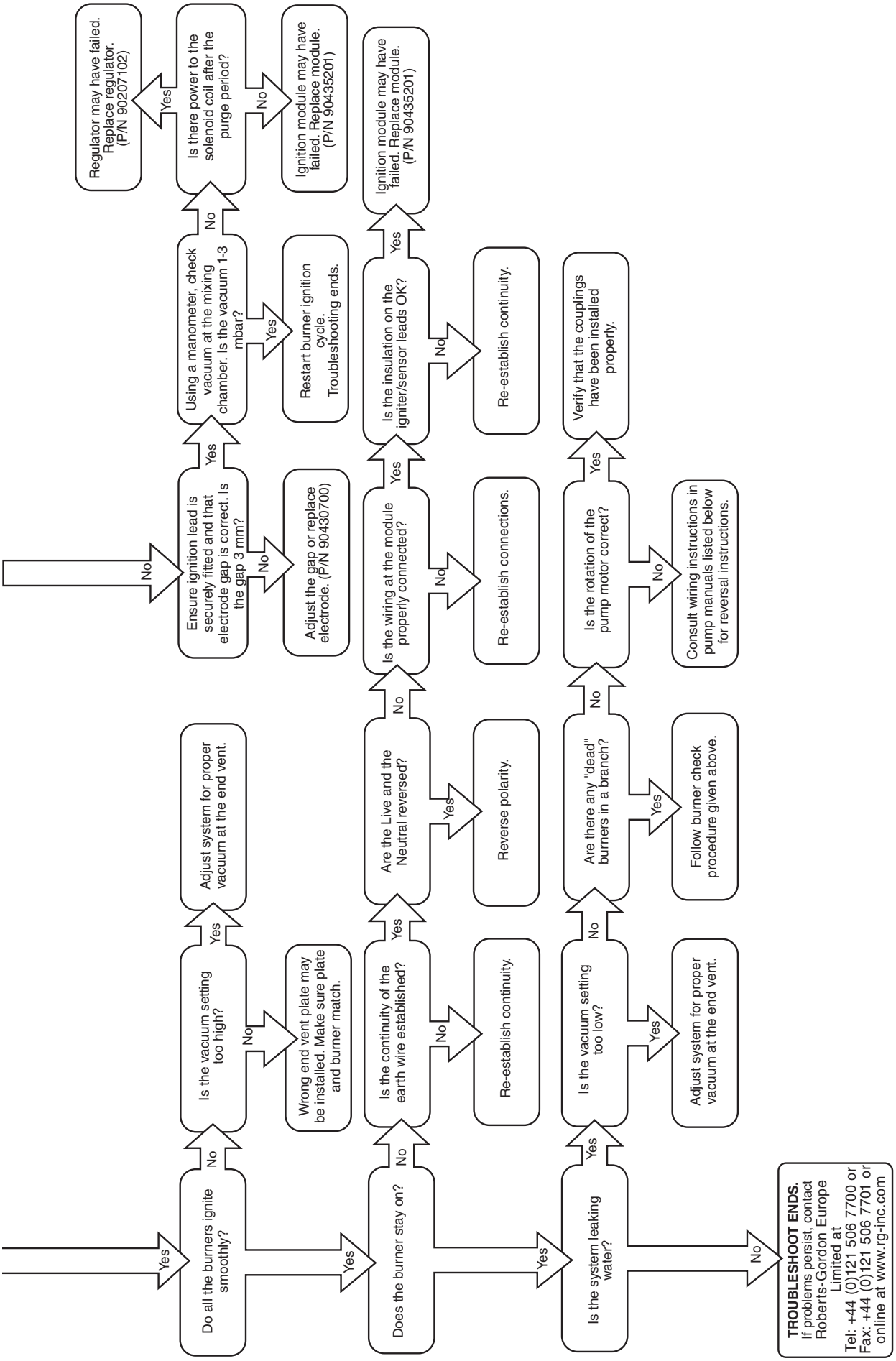
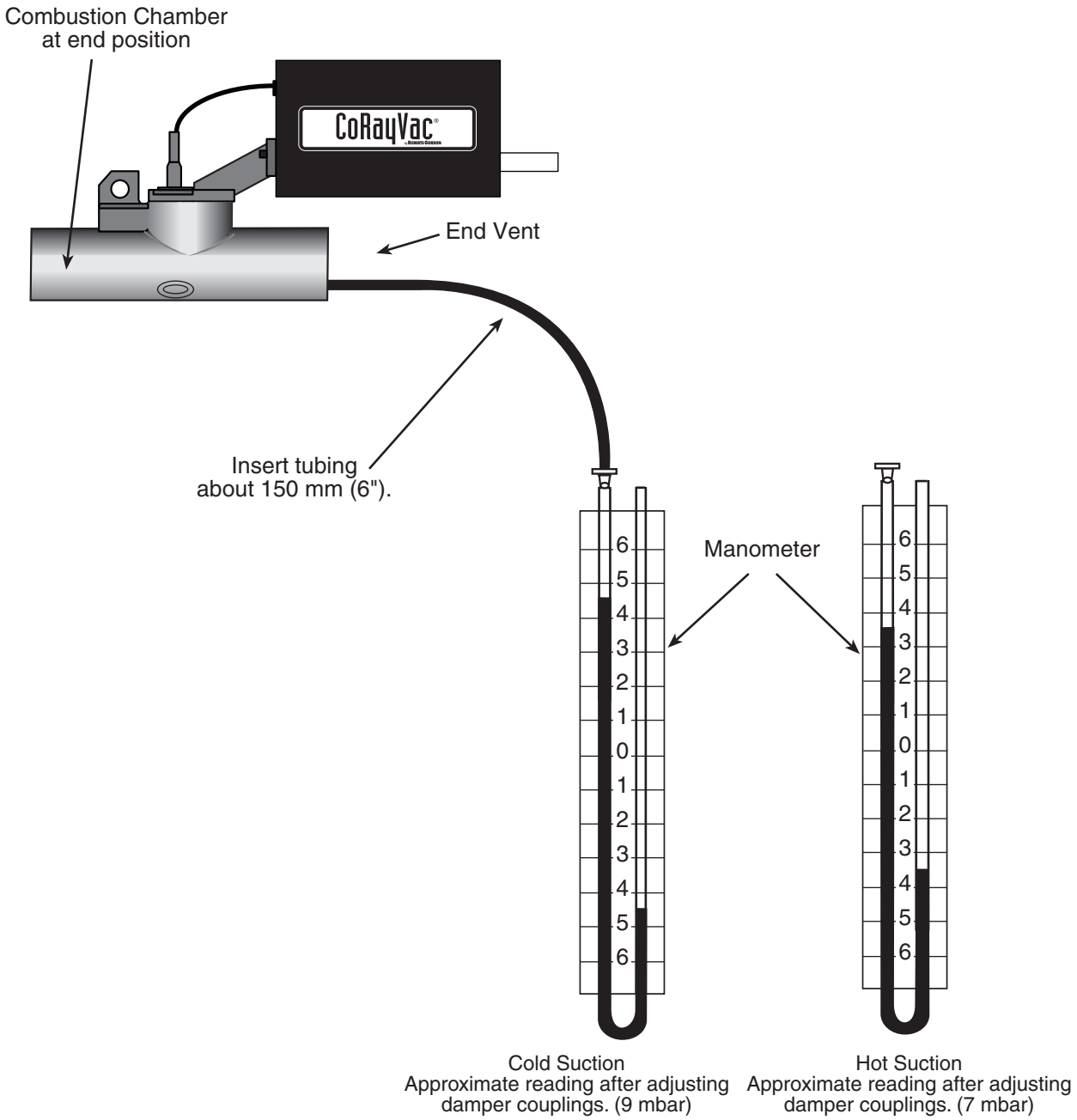
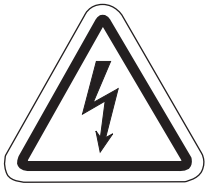


Figure 31: Vacuum Reading

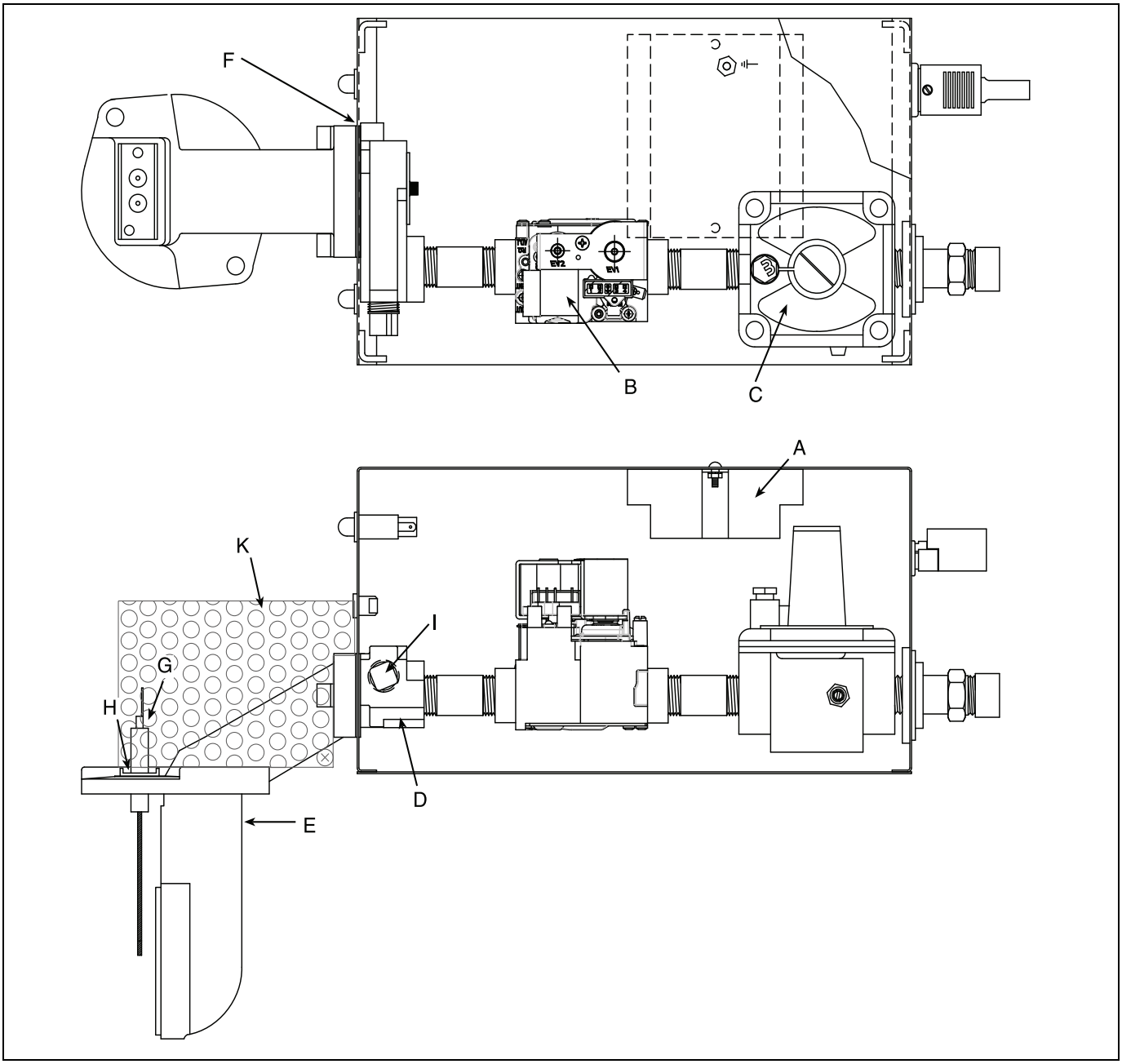


SECTION 15: REPLACEMENT PARTS

⚠ 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.



Item	Description	Part Number
A	Ignition Module	90435203
B	Gas Valve	90033101
C	Regulator	90207102
D	Mixing Block	02790400
E	Burner Head Assembly	02721702
F	Gasket - 2 required (Burner Head to Mixing Block)	01351100
N/S	Replacement Burner Head	02721700
G	Electrode	90430700
H	Electrode Gasket	02558501
I	Jet (see *Section 2*) located behind pipe plug	
N/S	Main Wire Harness No Filter	02950007

Item	Description	Part Number
N/S	Sense Lead Wire	02950003
N/S	Gas Valve Harness	02950006
N/S	Ignition Wire	90427704
N/S	Filter	90707000
N/S	Filters (box of 24 with gaskets)	01312400
N/S	Gasket (Burner Head to Combustion Chamber)	01367800
N/S	Mica Window Assembly	02553203
N/S	Lockout Indicator Connector	91324000 91324001
N/S	Combustion Chamber Gasket	01367800
K	Electrode Cover	E0008108

SECTION 16: SPECIFICATIONS

16.1 Material Specifications

16.1.1 Combustion and Tubes

100 mm dia 16 gauge heat treated aluminised mild steel.

16.1.2 Reflectors

NS3 H14 aluminium or 1.4016 2R stainless steel (option).

16.2 Burner Specifications

16.2.1 Sequence Controller

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

16.2.2 Electrical

Rating: 230 V, 50/60 Hz, 1 Ø, 1 A

Connection: 3 pin moulded plug.

16.2.3 Gas Supply

Connection:Rc-1/2 (1/2" BSP int)

Natural G20:

Minimum - Inlet 11 mbar (4.4 in wc)

Maximum - Inlet 50 mbar (20 in wc)

Natural G25:

Minimum - Inlet 15 mbar (6 in wc)

Maximum - Inlet 50 mbar (20 in wc)

LP Gas (Propane or Butane):

Minimum - Inlet 32 mbar (13 in wc)

Maximum - Inlet 50 mbar (20 in wc)

16.3 Venting Specifications

16.3.1 Pumps

RG-30-1 Ø RG-30-3 Ø

RG-45-1 Ø RG-45-3 Ø

Consult the manufacturer for availability of alternate pumps.

16.3.2 Flue

Flue will be 150 mm dia duct. Flue material must conform to National Codes. The flue must be self supporting.

16.4 Suspension Specifications

Hang heater with materials with a working load of 33 kg (75 lbs). *See Page 14, Figure 11*.

16.5 Controls Specifications

Factory assembled control panels, time switches and thermostats are available. Consult your factory representative for proper connection to electrical supply circuits.

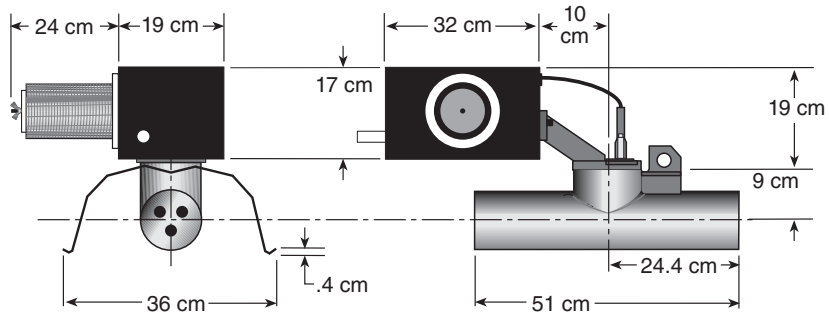
16.6 CORAYVAC® Heater

	CRT10	CRT15	CRT20	CRT25	CRT30
Input - Gross (kW)	10	15	20	25	30
Input - Net (kW)	9	13.5	18	22.5	27
Heated Area (m^2)	16-105	24-158	32-210	40-263	48-316
Minimum Installation Height (m)	2.5	3.0	3.5	4.0	4.5
Weights:					
Burner and Combustion Chamber			9.5 kg / burner		
Radiant Tube with reflector, brackets, etc.			4.3 kg/m		
Flow Units/burner	1.0	1.5	2.0	2.5	3.0
Flow Units/end vent	2.0	2.0	3.0	4.0	5.0
Maximum Burners/Branch	6	5	4	3	3
Maximum Flow Units/Branch	8.0	10.5	12.0	12.5	15.0
Gas Consumption*					
G20 (m^3/h)	0.95	1.43	1.91	2.38	2.86
G25 (m^3/h)	1.11	1.66	2.22	2.77	3.32
G31 (m^3/h) [kg/h]	0.38 [0.72]	0.56 [1.08]	0.75 [1.44]	0.94 [1.80]	1.13 [2.16]
G30 (m^3/h) [kg/h]	0.29 [0.73]	0.43 [1.10]	0.57 [1.47]	0.72 [1.83]	0.86 [2.20]

* Based on Gross Calorific Value.

16.7 Burner Specifications

General Specifications for CORAYVAC® heaters are as follows:



***See Page 5, Section 3* for clearances to combustibles.**

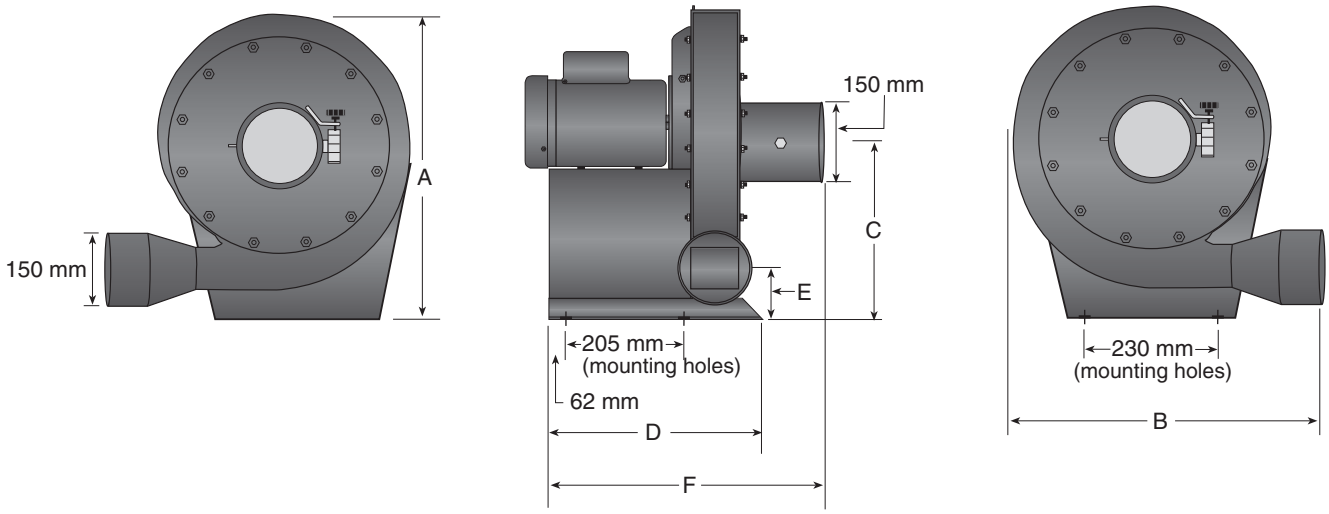
BURNER COMPONENTS

	Air Shutter	End Vent Plate	Orifice Size			
			G20	G25	G31	G30
CRT 10	#01	#2	#35 (black)	3.0 mm (fluor yellow)	2.4 mm (fluor red)	#44 (silver)
CRT 15	#15	#2	3.4 mm (fluor orange)	3.7 mm (fluor pink)	#35 (black)	2.6 mm (fluor green)
CRT 20	#6	#3	#22 (rose)	#19 (red)	#30 (yellow)	3.0 mm (fluor yellow)
CRT 25	#8	#4	#14 (purple)	#10 (orange)	3.7 mm (fluor pink)	3.5 mm (fluor blue)
CRT 30	#30	#5	#7 (white)	#3 (drk green)	#22 (rose)	#25 (brown)

NOTE: fluor = fluorescent.

16.8 Pump Dimensions and Specifications

Pump Dimensional Data (mm)						
Model	**A**	**B**	**C**	**D**	**E**	**F**
RG30-1	650	630	386	430	124	545
RG30-3	650	630	386	430	124	545
RG45-1	674	650	396	435	121	567
RG45-3	674	650	396	435	121	548



Pump Specifications

Model	RG30-1	RG45-1	RG30-3	RG45-3
Part No.	90710108	90710109	90710111	90710112
Weight (kg)	41.5	43.5	41.5	43.5
Power (W)	750	1100	750	1100
Run Current (A)	3.25	4.8	2.75	2.75
Start Current (A)	14.25	23.0	8.5	13.2
Supply (V)	230 V 1 Ø 50 Hz	230 V 1 Ø 50 Hz	400 V 3 Ø 50 Hz	400 V 3 Ø 50 Hz

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

ROBERTS GORDON®
Infrared Heating

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

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 below.

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.

TO TURN OFF THE HEATER

1. Set the thermostat to off or the lowest setting.

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

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 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.

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

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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 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.

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, Operation and Service Manual.

This product is not for residential use.

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