

CRV 4-40 Replacement Burner

Installation, Operation & Service Manual

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.

⚠ 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 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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This heater is not certified to meet the requirements of NFPA30A-2012 Section 7.6.6. (maximum tube temperature of 750° F (399° C). Do not install this heater in facilities where major repairs are conducted on compressed natural gas (CNG) or liquefied natural gas (LNG) fueled vehicles.

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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. This heater is not certified to meet the requirements of NFPA30A-2012 Section 7.6.6. (maximum tube temperature of 750 °F (399 °C)). Do not install this heater in facilities where compressed natural gas (CNG) or liquid natural gas (LNG) are present. 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 in accordance to the Occupational Safety and Hazard Administration (OSHA). Gear must be in accordance to NFPA 70E, latest revision when working with electrical components. Thin sheet metal parts have sharp edges. To prevent injury, the use of work gloves is recommended. The use of gloves will also prevent the transfer of body oils from the hands to the surface of the reflector.

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

This heater must be applied and operated under the general concepts of reasonable use and installed using best building 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 LLC.

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 LLC or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. See *Page 2, Figure 1 through Page 3, Figure 2*.

1.3 California Proposition 65

In accordance with California Proposition 65 requirements, a warning label must be placed in a highly visible location on the outside of the equipment (i.e., near equipment's serial plate). See label placement drawing on *Page 2, Figure 1* for label location. Avoid placing label on areas with extreme heat, cold, corrosive chemicals or other elements. To order additional labels, please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor.

FIGURE 1: Side Panel Label Placement

Control Side Panel

Logo Label

Rating Plate Label

Internal Ladder Diagram Label

Filter Side Panel (inside)

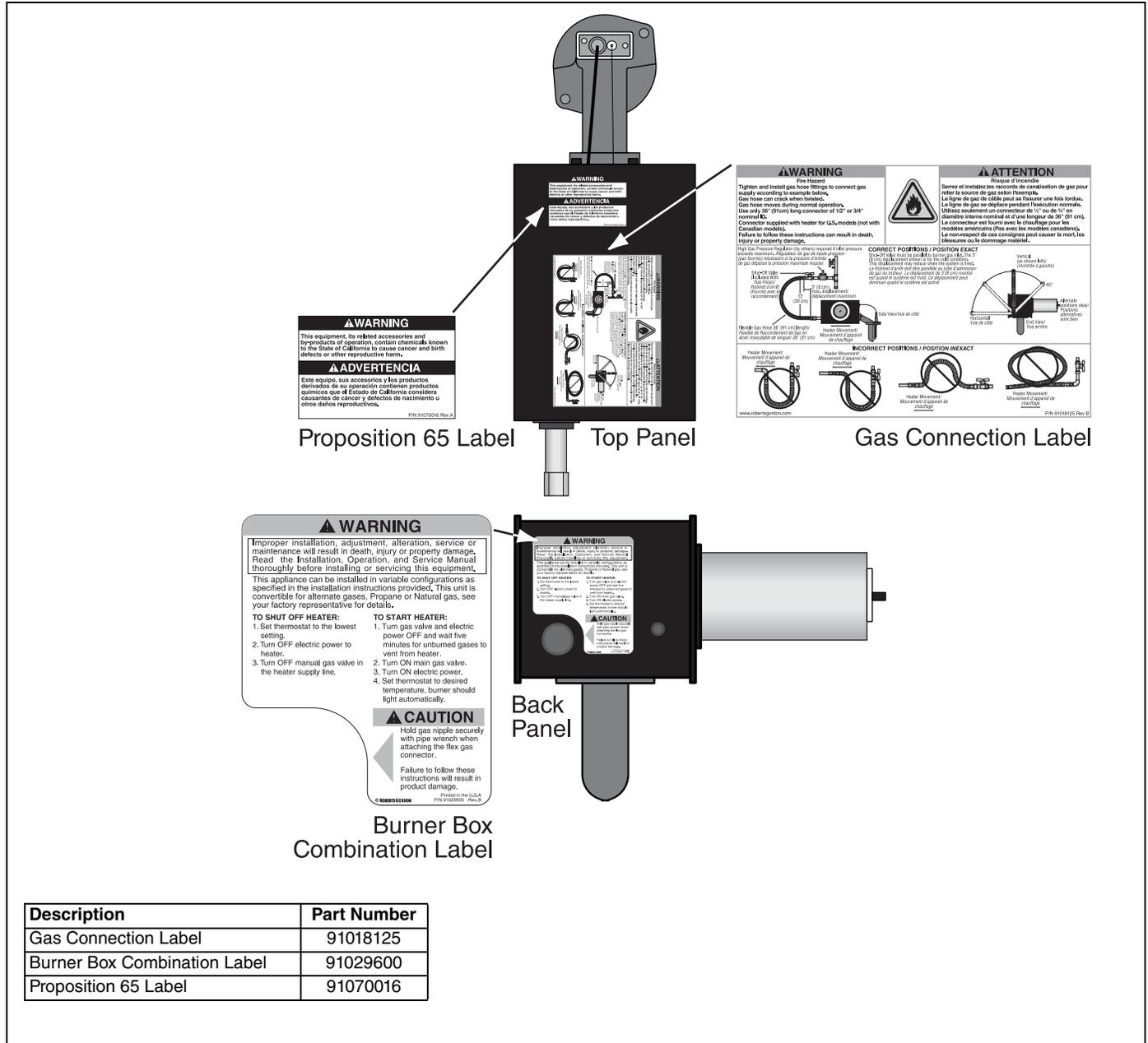
Wiring Label

Clearances to Combustibles Label

Control Side Panel (inside)

Description	Part Number
Logo Label	91007901
Rating Plate Label	91010460
Clearances to Combustibles Label	91009101
Internal Ladder Diagram Label	91017301
Wiring Label	91017300

FIGURE 2: Top and Back Panel Label Placement



Description	Part Number
Gas Connection Label	91018125
Burner Box Combination Label	91029600
Proposition 65 Label	91070016

SECTION 2: INSTALLER RESPONSIBILITY

The installer is responsible for the following:

- To install the heater, as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon LLC 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 cited codes and regulations to perform the installation.
- To install the heater in accordance with the clearances to combustibles requirements.
- To furnish all needed materials not furnished as standard equipment.
- To provide access to burners on all sides for servicing or burner removal.
- To provide the owner with a copy of this Installation, Operation and Service Manual.
- To never use heater as a support for ladder or other access equipment and to never hang or suspend anything from heater.
- To ensure there is adequate air circulation around the heater and to supply air for combustion, ventilation and distribution in accordance with local codes.
- To safely and adequately install heater using materials with a minimal working load of 75 lb (33 kg).
- To ensure the heater is placed in an approved application.

2.1 Wall Tag

A laminated wall tag is available for the heater as a permanent reminder of the safety instructions and the importance of the required clearances to combustibles. Please contact Roberts-Gordon LLC 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 CRV-Series heater (e.g. thermostat or controller).

A copy of the wall tag (P/N 91037912) is illustrated on the back cover. For an immediate solution, you may affix this copy 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 proper clearance dimensions in permanent ink according to your model number and configuration in the open spaces on the tag.

2.2 Corrosive Chemicals


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

Roberts-Gordon LLC 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 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 that may catch 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 the burner of the heater and 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 90° F (32°C) 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 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 vapors.
- Hang heater in accordance to the minimum suspension requirements *on Page 9, Figure 5.1.*
- 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.

SECTION 4: NATIONAL STANDARDS AND APPLICABLE CODES

4.1 Gas Codes

The type of gas appearing on the nameplate must be the type of gas used. Installation must comply with national and local codes and requirements of the local gas company.

United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

4.2 Aircraft Hangars

Installation in aircraft hangars must be in accordance with the following codes:

United States: Refer to Standard for Aircraft Hangars, NFPA 409 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

In aircraft storage and servicing areas, heaters shall be installed at least 10' (3 m) above the upper surface of wings or of engine enclosures of the highest aircraft which may be housed in the hangar. The measurement shall be made from the wing or engine enclosure (whichever is higher from the floor) to the bottom of the heater.

- In shops, offices and other sections of aircraft hangars communicating with aircraft storage or servicing areas, heaters shall be installed not less than 8' (2.4 m) above the floor.
- Suspended or elevated heaters shall be so located in all spaces of aircraft hangars that they shall not be subject to injury by aircraft, cranes, movable scaffolding or other objects. Provisions shall be made to assure accessibility to suspended heaters for recurrent maintenance purposes.

4.3 Public Garages

Installation in garages must be in accordance with the following codes:

United States: Refer to Standard for Parking Structures NFPA 88A - latest revision or the Code for Motor Fuel Dispensing Facilities and Repair Garages, NFPA 30A - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

- Heaters must not be installed less than 8' (2.4 m) above the floor. Minimum clearances to combustibles must be maintained from vehicles parked below the heater.
- When installed over hoists, minimum clearances to combustibles must be maintained from the upper most point of objects on the hoist.

4.4 Electrical

The heater must be electrically grounded in accordance with the following codes:

United States: Refer to National Electrical Code®, NFPA 70 - latest revision. Wiring must conform to the most current National Electrical Code®, local ordinances and any special diagrams furnished.

Canada: Refer to Canadian Electrical Code, CSA C22.1 Part 1 - latest revision.

4.5 Venting

The venting must be installed in accordance with the requirements within this manual and the following codes:

United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision.

Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

4.6 High Altitude

These heaters are approved for installations up to 2000' (610 m)(US), 4500' (1370 m)(Canada) without modification. Consult factory if US installation is above 2000' (610 m) or Canadian installation is above 4500' (1370 m).

4.7 Standard Parts List

Table 1: Contents of CRV-Series Burner Carton

Part No.	Description
0440XXXX	Burner, CRV 4-40 Replacement Burner
*91412200	Flexible Stainless Steel Gas Hose, 1/2" NPT (US models only)
01397300	Accessory Package
01361200	Filter Support Disk
02724901	Door Assembly w/ Hole
91115100	Screw #10 - 24 x 5/8
91119500	U-Clip
91905500	Filter Support
92123900	Nut 5/16 - 18
92511601	Wing Nut #10 - 24
96411600	Lock Washer 5/16"
01312401	Filter and Gasket
02793010	CRV 4-40 Adapter
97213923	Bolt, 5/16-18 x 5/8 Hex Socket Head
01367820	Gasket, CRV 4-40 Comb Chamber - Lower
01367810	Gasket, CRV 4-40 Comb Chamber - Upper
94273914	Bolt 5/16-18 Hex HD Swage form
95211600	Washer 5/16 Flat
95310800	Washer #8 Flat
01367603	End Vent, CRV 4-40
127140NA	Manual, CRV 4-40 Replacement Burner

* Canadian Models: Rubber (Type 1) Gas Hoses available as an accessory. See Page 11, Figure 3.

- To safely and adequately install heater using materials with a minimal working load of 75 lbs. (33kg)
- To ensure the heater is placed in an approved application.

4.8 Installer Responsibility

The installer is responsible for the following:

- To install burner as well as the gas and electrical supplies, in accordance with applicable specifications and codes. Roberts-Gordon recommends installer to contact local building inspector or fire marshal for guidance.
- To use the information given in a layout drawing and in the manual together with cited codes and regulations 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 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 a 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, ventilation and distribution in accordance with local codes.

SECTION 5: HEATER INSTALLATION

Typical installation configurations are shown on Page 9, Figure 5.1.

! WARNING

<p>Severe Injury Hazard</p> <p>Standard CORAYVAC® Systems</p> <p>Secure burner to combustion chamber with nuts and lockwashers.</p> <p>Failure to follow these instructions can result in death, injury or property damage.</p>

! WARNING

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

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

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

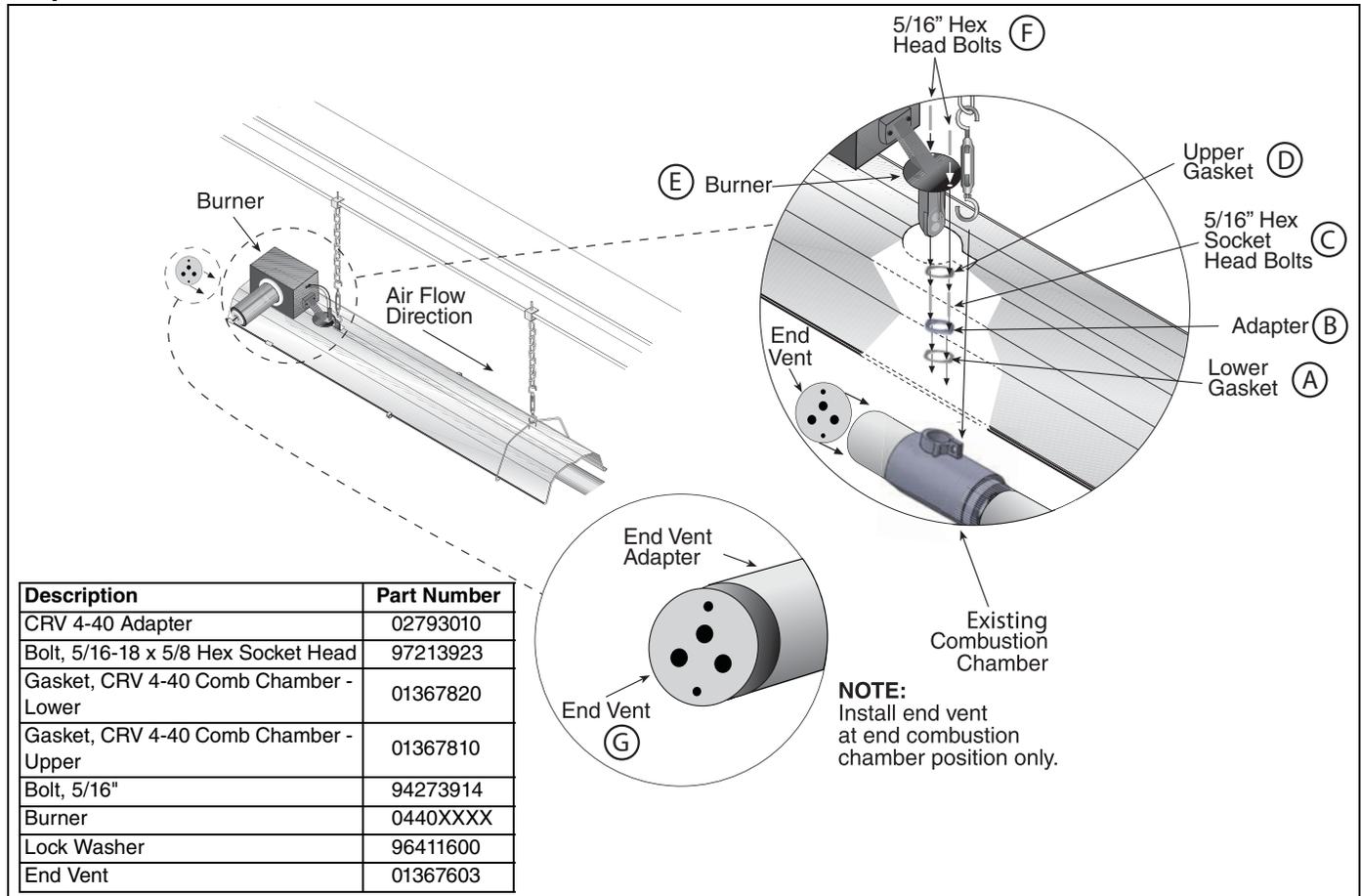
Do not locate the gas or electric supply lines directly over the path of the flue products from the heater.

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

The heaters must be installed in accordance with clearances to combustibles as indicated on the rating plate and in this instruction manual.

The minimum and maximum gas inlet pressures must be maintained as indicated on the rating plate.

Step 5.1 Burner Installation



Step 1: Burner Removal

1. Turn off power supply and disconnect wires from existing burner.
2. Turn off gas supply, disconnect gas line from existing burner.
3. If outside air is installed, disconnect.
4. Remove the 5/16" bolts which hold the existing burner on the combustion chamber.
5. Remove the burner.
6. Remove the current end vent. End vent is located on the end of the heat exchanger furthest from vacuum pump.

Step 2: Preparing for Installation

1. Remove the pilot shield plate from inside the combustion chamber.
2. Clean inside combustion chamber and burner seating location.

Step 3: Burner Replacement

1. **(A)** Place lower gasket on the combustion chamber. (01367820)
2. **(B)** Place the CRV 4-40 adapter on combustion chamber over lower gasket.

3. **(C)** Screw CRV 4-40 adapter to combustion chamber with two 5/16" - 18x5/8" hex socket heads. (97213923)
4. **(D)** Place upper gasket (01367810) on top of adapter.
5. **(E)** Install the CRV 4-40 replacement burner with burner screen facing air flow direction over upper gasket.
6. **(F)** Secure burner with 5/16" bolt (94273914) and flat washer (95211600).
7. **(G)** Install new end vent plate (01367603) by placing flat washer #8 (95310800) and tighten the nut.
8. Reconnect all electrical and gas connection according to the Roberts-Gordon manual.

Step 4: Start up the Burner

1. Set the vacuum pressure (cold) on 3.5 inch of water column.
2. Allow all burners to ignite.
3. Let burners fire for 30 minutes, then reset the vacuum pressure to 2.5" - 3.0" wc.

SECTION 6: GAS PIPING

⚠ WARNING



Fire Hazard

Tighten gas hose fittings to connect gas supply according to Figure 28.

Gas hose can crack when twisted.

Gas hose moves during normal operation.

Use only 36" (91 cm) long connector of 1/2" or 3/4" nominal ID.

Connector supplied with heater for U.S. models (not with Canadian models).

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.

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 3*.

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 1/2" wc. When gas piping is not included in the layout drawing, the local gas supplier will usually help in planning the gas piping.

Gas lines must meet applicable codes:

United States: The Flexible Stainless Steel Gas Hose (US models) supplied with the heater is certified per the Standard for Connectors for Gas Appliances, ANSI Z21.24/CSA 6.10 - latest revision.

Canada: The Rubber Type 1 Gas Hose (Canadian models) optional with the heater is certified as being in compliance with the Standard for Elastomeric Composite Hose and Hose Couplings for Conducting Propane and Natural Gas, CAN/CGA 8.1 - Latest revision.

- **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.**

Install the gas hose as shown on *Page 11, Figure 3*. 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.

FIGURE 3: Gas Connection with Flexible Gas Hose

CORRECT POSITIONS

Shut-Off Valve (included with gas hose) must be parallel to burner gas inlet. The 3" (8 cm) displacement shown is for the cold condition. This displacement may reduce when the system is fired.

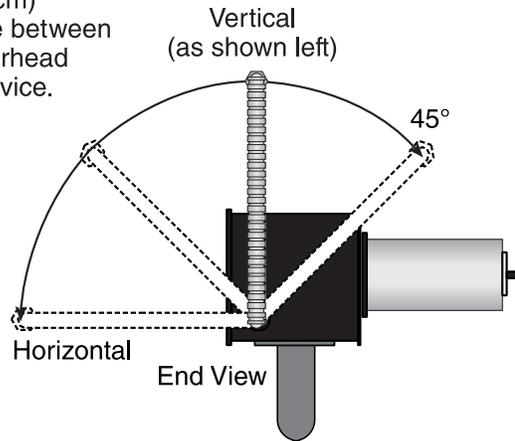
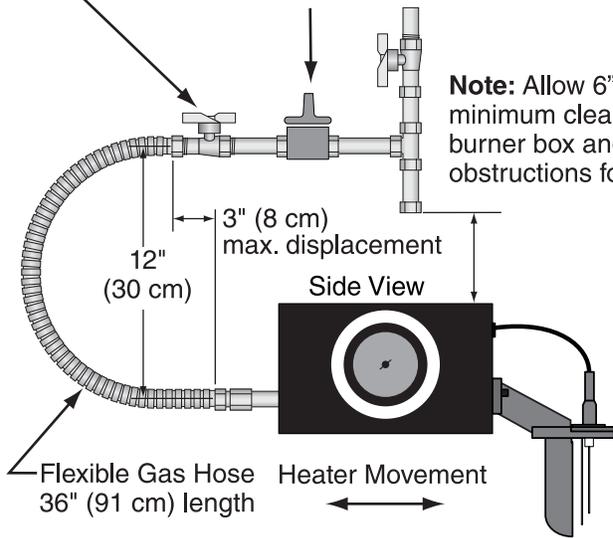
High Gas Pressure Regulator to be installed upstream of flexible gas hose if inlet pressure exceeds maximum allowance. See Page 24, Section 11.

⚠ CAUTION

Product Damage Hazard

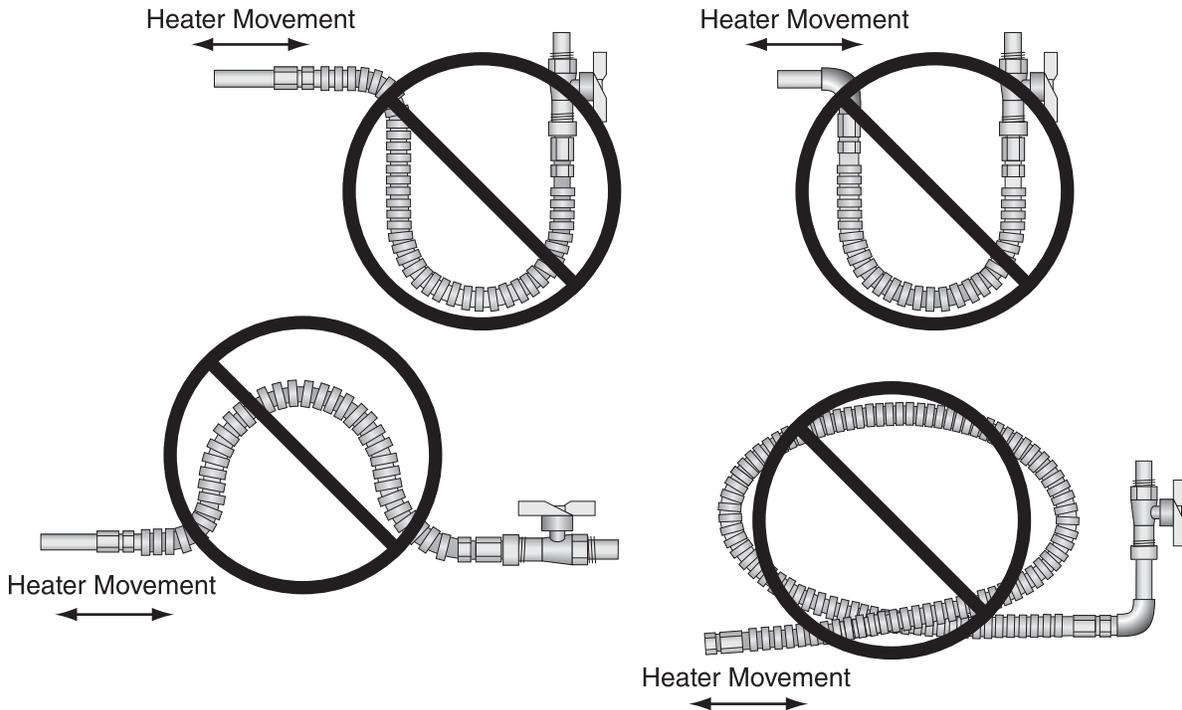
Hold gas nipple securely with pipe wrench when attaching gas hose.

Failure to follow these instructions can result in product damage.



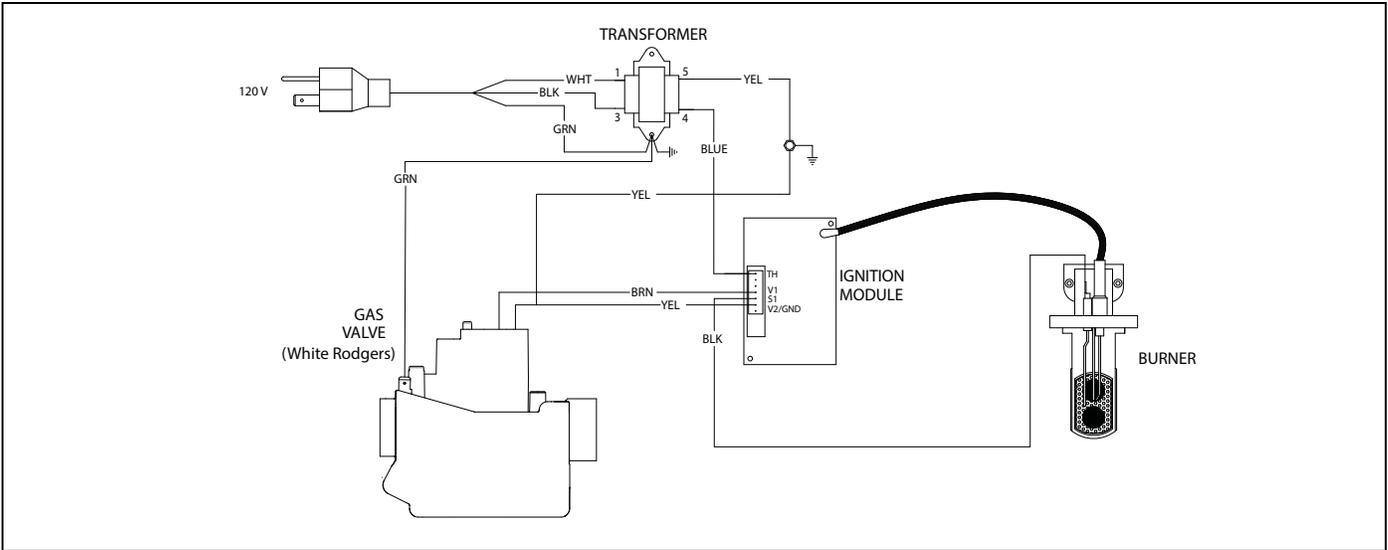
Description	Part Number
High Pressure Regulator - 2 psi	90207600
High Pressure Regulator - 5 psi	90207601

INCORRECT POSITIONS (WRONG INSTALLATION)



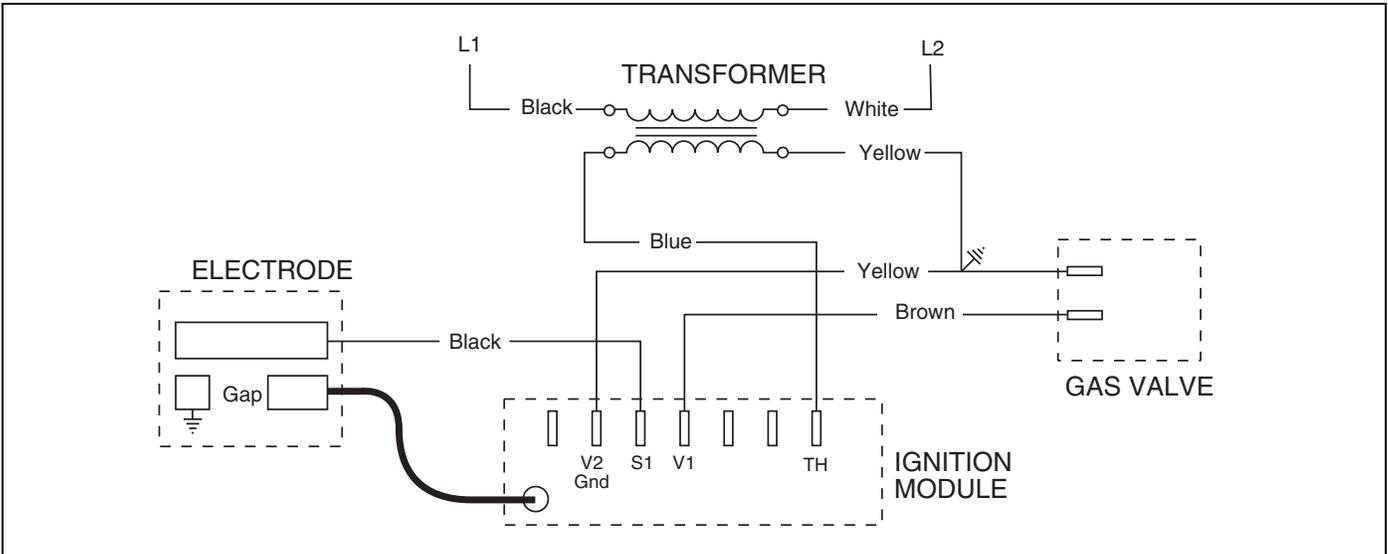
Description	Part Number
1/2" Flexible Stainless Steel Gas Hose (US Models)	91412200
1/2" Rubber (Type 1) Gas Hose (Canadian Models)	91412206

FIGURE 4: 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 volts.

FIGURE 5: Burner Internal Ladder Diagram



SECTION 7: STARTING THE SYSTEM

⚠ DANGER		⚠ WARNING	
			
Electrical Shock Hazard	Explosion Hazard	Carbon Monoxide Hazard	Burn Hazard
<p>Disconnect electric before service.</p> <p>More than one disconnect switch may be required to disconnect electric from heater.</p> <p>Heater must be connected to a properly grounded electrical source.</p>	<p>Leak test all components of gas piping before operation.</p> <p>Gas can leak if piping is not installed properly.</p> <p>Do not high pressure test gas piping with equipment connected.</p>	<p>Heaters installed unvented must be interlocked with sufficient building exhaust.</p> <p>Heaters must be installed according to the installation manual.</p>	<p>Allow heater to cool before service.</p> <p>Tubing may still be hot after operation.</p>
Failure to follow these instructions can result in death, electric shock, injury or property damage.			

Start with the main gas valve closed and the electric power off.

7.1 Checking the Gas Line

1. Open the main valve and verify that no gas is flowing through the meter.
2. Purge the line if this was not done following pressure testing with air.
3. Verify that the gas pressure is not above 14" wc (1/2 PSIG).
4. Close the main gas valve.

7.2 Checking the Electrical System

1. See that all temperature setpoints are set below room temperature.
2. Turn on power supply to system controls.
3. Check to see that no part of the system (i.e. burners, pump or air supply blower) is powered.
4. Individually check each zone by raising the zone temperature set points separately. Raising each zone temperature set point above room temperature should start the pump immediately. After a 45 second delay, the burners will begin their ignition sequence by sparking at the electrode (visible through the burner window).

5. Vacuum pump motors can be wired to rotate the impeller in either direction. A negative pressure can still be measured when the impeller is running backwards. An arrow is affixed to the outside of the pump scroll to indicate the direction of rotation of the impeller. Ensure proper rotation of the impeller prior to setting the vacuum pressure.
6. Make a preliminary vacuum check at burners in branches that have an adjustable damper coupling. See Page 15, Figure 6 for manometer hookup to check vacuum. This check is to insure that all dampers are open before the system is fired. Vacuum, as measured at the end vents, should be approximately 3.5" wc or slightly above (cold).

7.3 Starting the System

NOTE: During the initial firing, the protective oil on the tubing may smoke for 30 to 60 minutes and adequate ventilation should be provided.

1. Start with all temperature setpoints below room temperature.
2. Open main gas valve.
3. Turn up temperature setpoints one zone at a time, waiting to see that all burners in a zone

start. When the burner ignites, a blue flame will be observed through the viewer window.

4. If any abnormal operation occurs, see the troubleshooting section of the service instructions.

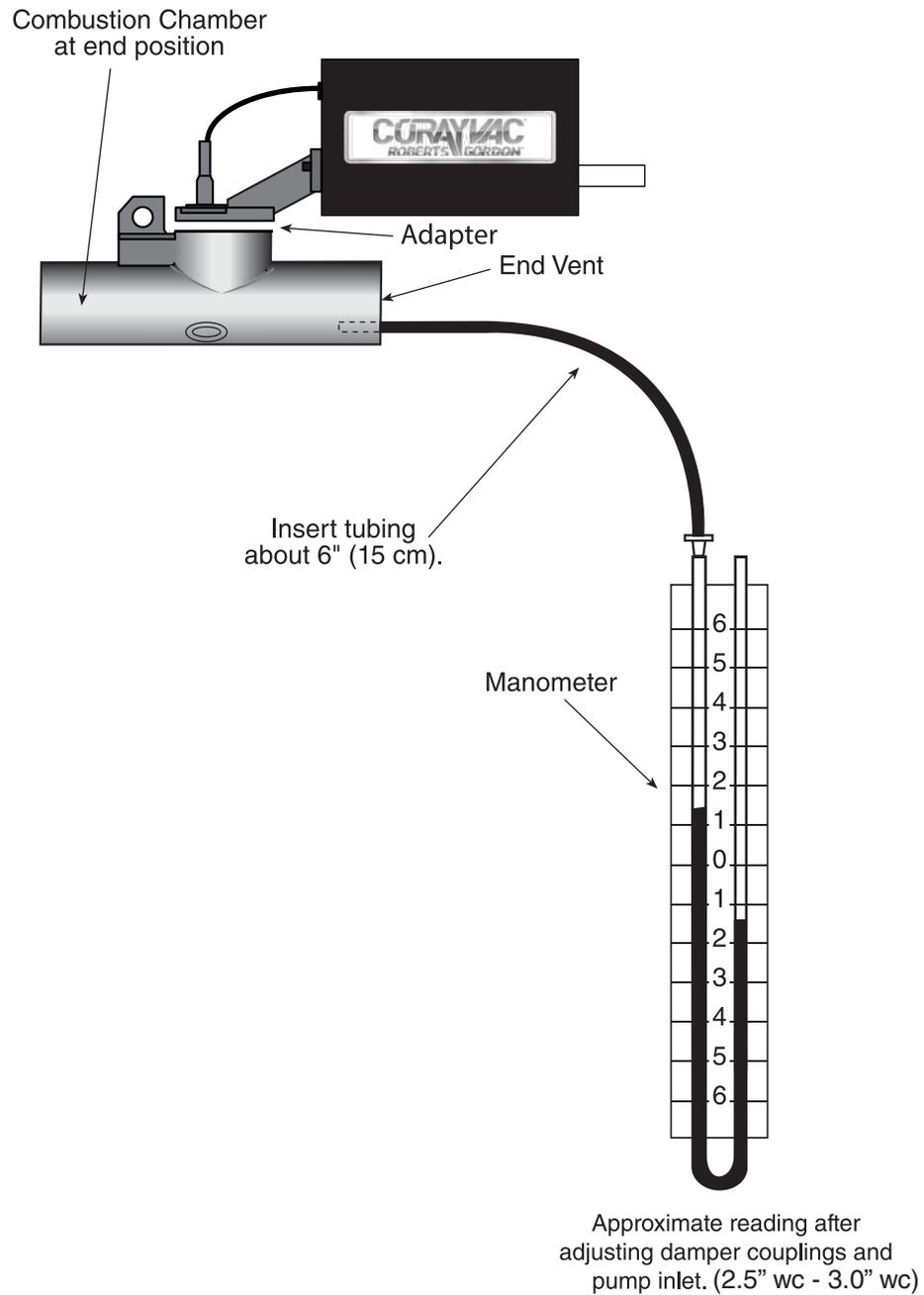
7.4 Setting the Vacuum

1. Set temperature setpoints above room temperature. See that all burners are operating properly.
2. Allow at least ½ hour operation for temperature to normalize, then check system vacuum balance. Vacuum can be measured by inserting a manometer hose into the end vent as shown *on Page 15, Figure 6*. Normal end vent vacuum should be set at approximately 2.5" wc to 3.0" wc (hot). For best results, set vacuum to 2.8" wc. Vacuum adjustments are made by means of the damper in the pump inlet and the adjustable damper coupling(s) in the system. Check the vacuum at all end vents and then adjust the damper coupling to obtain equal vacuum readings of 2.5" wc to 3.0" wc. If end vent vacuum exceeds 3.0" wc, adjust the pump inlet damper until vacuum readings are 2.5" wc to 3.0" wc.

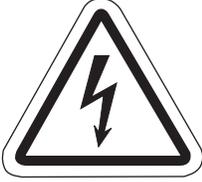
With systems designed to operate at maximum vacuum, it may not be possible to obtain vacuum differential readings at or slightly above 2.5" wc. If so, adjust the damper couplings to maximum but equal vacuum reading. Be sure to lock all dampers securely after adjustment.

3. Reset temperature setpoints to desired room temperature.
4. If heat is not required, turn off main switch and close the main gas valve.

FIGURE 6: Vacuum Reading



SECTION 8: OPERATION AND MAINTENANCE

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

The heater is equipped with a direct-spark ignition system.

Turn OFF electric power to heater.
Turn OFF manual gas valve in the heater supply line.

8.1 Sequence of Operation

1. Turn the thermostat up. When the thermostat calls for heat, the pump will start immediately. After a short period, the burners will begin their ignition sequence. Sparking will begin at the electrodes and the gas valve will be energized 45 seconds later.
2. The flame will be sensed by the flame sensing rod and the electrode is de-energized.
3. If a flame is detected, the gas valve remains open. When the call for heat is satisfied, the burner shuts off.
4. If no flame is detected, the module will close and a purge period begins. If a flame is not established, a second purge and warm-up will take place and then a third trial cycle will begin. After three trials, the module will lockout for one hour or until reset.
5. A reset is accomplished by removing power from the module for at least 5 seconds (thermostat cycle is required) or automatically after 1 hour.

8.2 To Shut Off Heater

Set thermostat to lowest setting.

8.3 To Start Heater

Turn gas valve and electric power OFF and wait five minutes for unburned gases to vent from heater.
Turn ON main gas valve.
Turn ON electric power.
Set thermostat to desired temperature.
Burner should light automatically.

8.4 Pre-Season Maintenance and Annual Inspection

To ensure your safety and years of trouble-free operation of the heating system, service and annual inspections must be done by a contractor qualified in the installation and service of gas-fired heating equipment.
Turn off gas and electric supplies before performing service or maintenance. Allow heater to cool before servicing.
Before every heating season, a contractor qualified in the installation and service of gas-fired heating equipment must perform a thorough safety inspection of the heater.
For best performance, the gas, electrical, thermostat connections, tubing, venting, suspensions and overall heater condition should be thoroughly inspected.

NOTE: Gas flow and burner ignition are among the first things that should be inspected. Please see *Page 17, Section 8.5* for suggested items to inspect.

qualified in the installation and service of equipment sold and supplied by Roberts-Gordon LLC 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 LLC 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 LLC.

8.5 Maintenance Checklist

Installation Code and Annual Inspections:

All installation and service of ROBERTS GORDON® equipment must be performed by a contractor

The Vicinity of the Heater	<p>Do not store or use flammable objects, liquids or vapors near the heating system. Immediately remove these items if they are present.</p> <p><i>See Page 5, Section 3.</i></p>
Vehicles and Other Objects	<p>Maintain the clearances to combustibles.</p> <p>Do not hang anything from, or place anything on, the heater.</p> <p>Make sure nothing is lodged underneath the reflector, in between the tubes or in the decorative or protective grilles (included with select models).</p> <p>Immediately remove objects in violation of the clearances to combustibles.</p> <p><i>See Page 5, Section 3.</i></p>
Reflector	<p>Support reflector with reflector hanger and support strap.</p> <p>Reflector must not touch tube.</p> <p>Make sure there is no dirt, sagging, cracking or distortion.</p> <p>Do not operate if there is sagging, cracking or distortion.</p> <p>Make sure reflectors are correctly overlapped. <i>See Page 9, Figure 5.1.</i></p> <p>Clean outside surface with a damp cloth.</p>
Vent Pipe	<p>Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe or gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust.</p> <p>Remove any carbon deposits or scale using a wire brush.</p>
Outside Air Inlet	<p>Inlet must be intact. Look for obstructions, cracks on the pipe or gaps in the sealed areas or corrosion.</p> <p>The area must be free of dirt and dust. Clean and reinstall as required.</p>
Tubes	<p>Make sure there are no cracks.</p> <p>Make sure tubes are connected and suspended securely.</p> <p><i>See Page 9, Figure 5.1 through Page 9, Section 5.1.</i></p> <p>Make sure there is no dirt, sagging, bending or distortion.</p> <p>Clean or replace as required.</p>
Gas Line	<p>Check for gas leaks. <i>See Page 11, Figure 3.</i></p>
Combustion Chamber Window	<p>Make sure it is clean and free of cracks or holes.</p> <p>Clean or replace as required.</p>

Blower Scroll, Wheel and Motor	Compressed air or a vacuum cleaner may be used to clean dust and dirt.
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 or Sensor	There should be no exposed wire or damage to the thermostat or sensor. <i>See Page 11, Section 3.</i>
Suspension Points	Make sure the heater is hanging securely. Look for signs of wear on the chain or ceiling. <i>See Page 9, Figure 5.1.</i>
Filter	Check for dirt or dust. Clean or replace as required.
Decorative and Protective Grille (optional)	The grille must be securely attached. Check that side reflector extensions are installed correctly and secured in place if necessary. (Decorative grille only.) Make sure shield is installed correctly and secured in place if necessary. (Decorative grille only.)
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 trap is installed, check the condition of the trap and the drain line attached. Note: the condensate trap should be filled with water at the beginning of each heating season. Check the condition of the motor 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 wall tag is present, make sure it is legible and accurate. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor, if you need a wall tag. <i>See Page 4, Section 2.1.</i>
Safety Labels	Product safety signs or labels should be replaced by the product user when they are no longer legible. Please contact Roberts-Gordon LLC or your ROBERTS GORDON® independent distributor to obtain replacement signs or labels. <i>See Page 2, Figure 1 through Page 3, Figure 2.</i>

SECTION 9: TROUBLESHOOTING

⚠ DANGER**Electrical Shock Hazard**

Disconnect electric before service.

More than one disconnect switch may be required to disconnect electric from heater.

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.

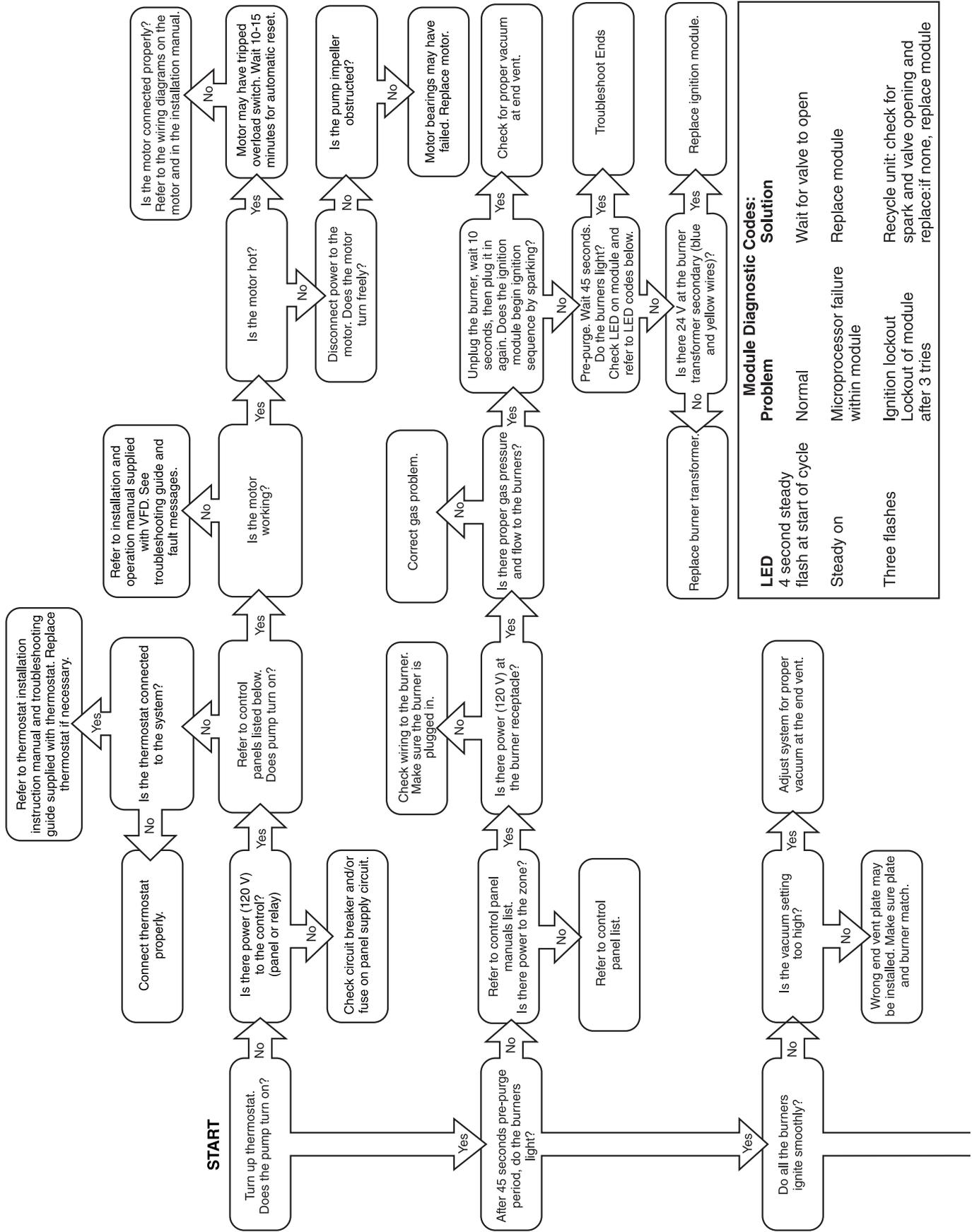
**Cut/Pinch Hazard**

Wear protective gear during installation, operation and service.

Edges are sharp.

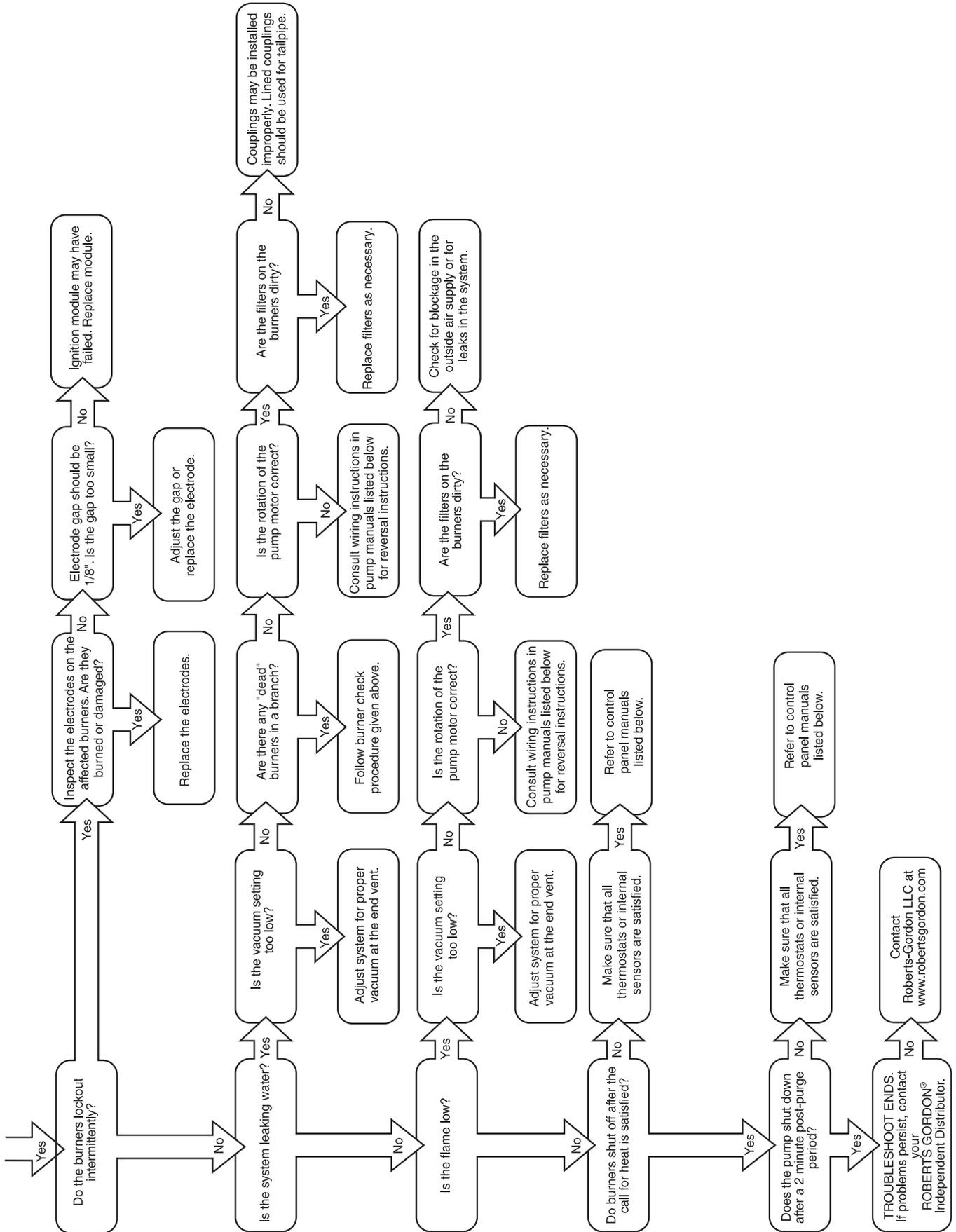
Failure to follow these instructions can result in death, injury or property damage.

9.1 Troubleshooting Flow Chart



Module Diagnostic Codes:	
LED	Solution
4 second steady flash at start of cycle	Normal
Steady on	Microprocessor failure within module
Three flashes	Ignition lockout Lockout of module after 3 tries
	Wait for valve to open
	Replace module
	Recycle unit: check for spark and valve opening and replace:if none, replace module

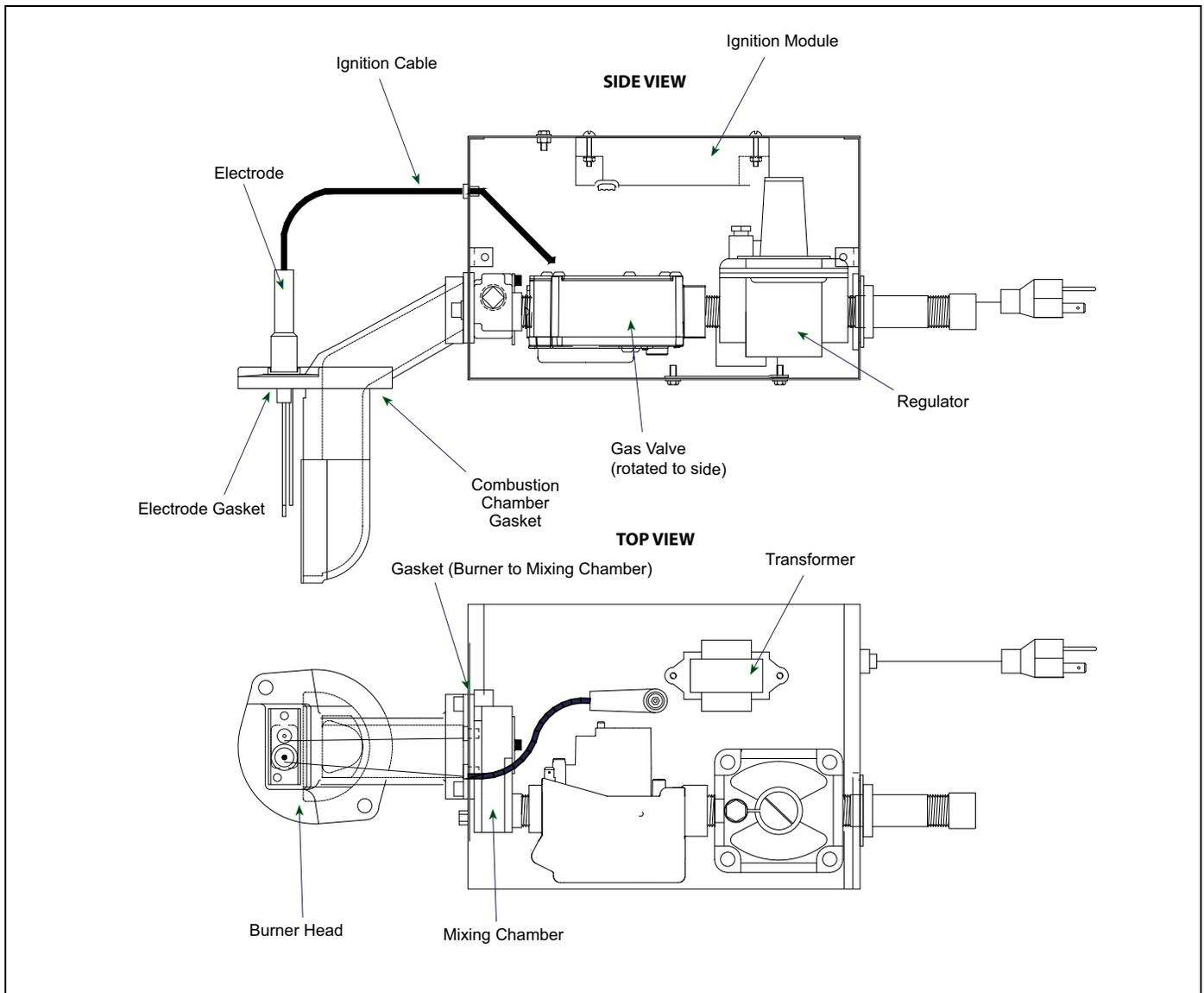
Troubleshooting Flow Chart



SECTION 10: REPLACEMENT PARTS

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

See warnings and important information before removing or replacing parts. After any maintenance or repair work, always test fire the heater in accordance with the start-up instructions on *Page 13, Section 7* 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 19, Section 9 through Page 25*.



Description	Part Number
Gas Valve LP or NG	90032512
Gasket (Burner to Mixing Chamber)	01351100
Burner Head Assembly Replacement Package (includes electrode and gasket installed)	02713000
Mixing Chamber	02790400
Transformer	90436900K
Regulator Replacement Kit	02725300
Electrode Replacement Kit (includes electrode, electrode gasket and mounting screws)	02713200
Ignition Module	90439500K
Ignition Cable	90427706
Filter Cartridge with Gasket (not shown)	01312401
CRV 4-40 Adapter (not shown)	02793010
Gasket, CRV 4-40 Comb Chamber - Lower (not shown)	01367820
Gasket, CRV 4-40 Comb Chamber - Upper (not shown)	01367810
End Vent, CRV 4-40 (not shown)	01367603

SECTION 11: GENERAL SPECIFICATIONS

11.1 Heater Specifications

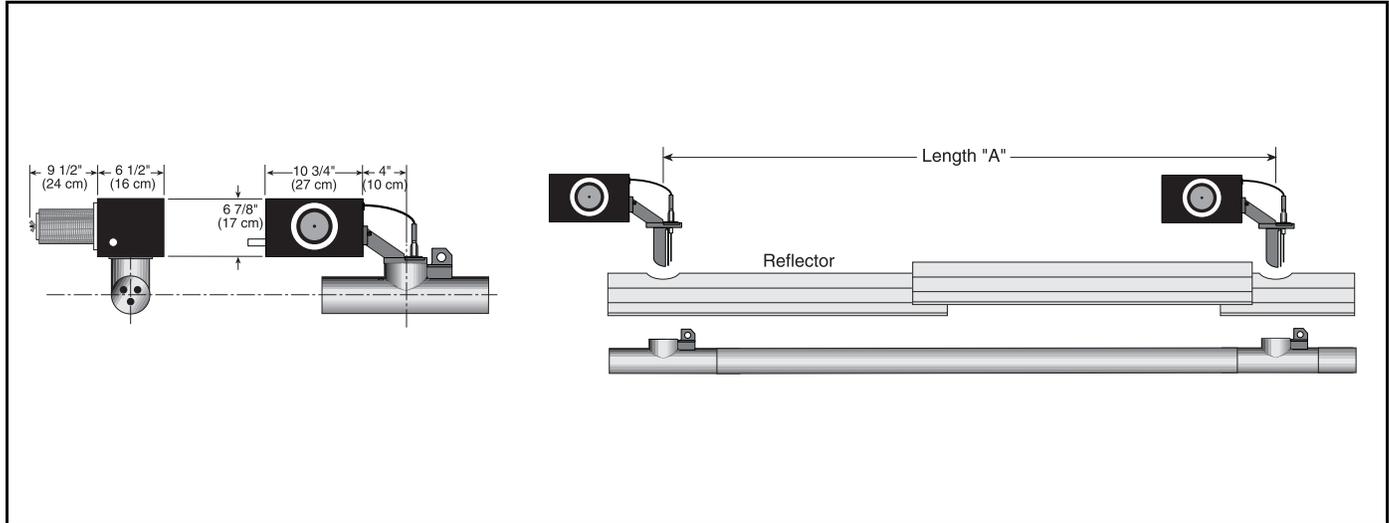
11.1.1 Ignition

Fully Automatic, Three-Try, Direct Spark, Electronic Ignition Control, 100% Safety Shut-Off.

11.2 Controls Specifications

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

General Specifications for CRV-Series heaters are as follows:



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

PIPE CONNECTION:

1/2" NPT

GAS INLET PRESSURE:

Natural Gas: 4.5" wc Minimum 14.0" wc Maximum

LP Gas: 10.5" wc Minimum 14.0" wc Maximum

DIMENSIONS:

Vent Connection Size: 4" (10 cm) or 6" (15 cm)

Outside Air Connection Size: 4" (10 cm)

Refer to figure above for dimensional information.

ELECTRICAL RATING:

120 V - 60 Hz, 0.3 A

SECTION 12: THE ROBERTS GORDON® CORAYVAC® LIMITED WARRANTY**ROBERTS-GORDON LLC WILL PAY FOR:**

Within 36 months from date of purchase by buyer or 42 months from date of shipment by Roberts-Gordon LLC (whichever occurs first), replacement parts will be provided free of charge for any part of the product which fails due to a manufacturing or material defect.

Roberts-Gordon LLC will require the part in question to be returned to the factory. Roberts-Gordon LLC will, at its sole discretion, repair or replace after determining the nature of the defect and disposition of part in question.

ROBERTS GORDON® warrants the cast iron combustion chamber of the ROBERTS GORDON® CORAYVAC® Classic System will be free from defects in material and workmanship. This warranty is limited to twenty-five (25) years from the date of shipment by Roberts-Gordon LLC. All other components of the ROBERTS GORDON® CORAYVAC® Classic System adhere to the standard warranty listed in the paragraph above.

ROBERTS GORDON® Replacement Parts are warranted for a period of 12 months from date of shipment from Roberts-Gordon LLC or the remaining ROBERTS GORDON® CORAYVAC® warranty.

ROBERTS-GORDON LLC WILL NOT PAY FOR:

Service trips, service calls and labor charges.

Shipment of replacement parts.

Claims where the total price of the goods have not been paid.

Damage due to:

- Improper installation, operation or maintenance.
- Misuse, abuse, neglect, or modification of the ROBERTS GORDON® CORAYVAC® in any way.
- Use of the ROBERTS GORDON® CORAYVAC® for other than its intended purpose.
- Incorrect gas or electrical supply, accident, fire, floods, acts of God, war, terrorism, or other casualty.
- Improper service, use of replacement parts or accessories not specified by Roberts-Gordon.
- Failure to install or maintain the ROBERTS GORDON® CORAYVAC® as directed in the Installation, Operation and Service Manual.
- Relocation of the ROBERTS GORDON® CORAYVAC® after initial installation
- The use of the ROBERTS GORDON® CORAYVAC® in a corrosive atmosphere containing contaminants.
- The use of the ROBERTS GORDON® CORAYVAC® in the vicinity of a combustible or explosive material.
- Any defect in the ROBERTS GORDON® CORAYVAC® arising from a drawing, design, or specification supplied by or on behalf of the consumer.
- Damage incurred during shipment. Claim must be filed with carrier.

WARRANTY IS VOID IF:

The ROBERTS GORDON® CORAYVAC® is not installed by a contractor qualified in the installation and service of gas fired heating equipment.

You cannot prove original purchase date and required annual maintenance history.

The data plate and/or serial number are removed, defaced, modified or altered in any way.

The ownership of the ROBERTS GORDON® CORAYVAC® is moved or transferred. This warranty is nontransferable.

Roberts-Gordon LLC is not permitted to inspect the damaged equipment and/or component parts.

READ YOUR INSTALLATION, OPERATION AND SERVICE MANUAL

If you have questions about your equipment, contact your installing professional. Should you need Replacement Parts or have additional questions, call or write:

Roberts-Gordon LLC

1250 William Street

P.O. Box 44

Buffalo, New York 14240-0044

Telephone: +1.716.852.4400

Fax: +1.716.852.0854 Toll Free: 800.828.7450

www.robertsgordon.com

Roberts-Gordon LLC's liability, and your exclusive remedy, under this warranty or any implied warranty (including the implied warranties of merchantability and fitness for a particular purpose) is limited to providing replacement parts during the term of this warranty. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to you. There are no rights, warranties or conditions, expressed or implied, statutory or otherwise, other than those contained in this warranty.

Roberts-Gordon LLC shall in no event be responsible for incidental or consequential damages or incur liability for damages in excess of the amount paid by you for the ROBERTS GORDON® CORAYVAC®. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

Roberts-Gordon LLC shall not be responsible for failure to perform under the terms of this warranty if caused by circumstances out of its control, including but not limited to war, fire, flood, strike, government or court orders, acts of God, terrorism, unavailability of supplies, parts or power. No person is authorized to assume for Roberts-Gordon LLC any other warranty, obligation or liability.

LIMITATIONS ON AUTHORITY OF REPRESENTATIVES:

No representative of Roberts-Gordon LLC, other than an Executive Officer, has authority to change or extend these provisions. Changes or extensions shall be binding only if confirmed in writing by Roberts-Gordon LLC's duly authorized Executive Officer.



OWNER WARRANTY REGISTRATION CARD

Mail or Fax to:

Roberts Gordon LLC • 1250 William Street, P.O. Box 44 • Buffalo, NY 14240-0044 • Phone: 716-852-4400 • Fax: 716-852-0854
Toll Free: 800-828-7450 • www.robertsgordon.com

About the Owner:

Name: _____
Address: _____ City: _____ State: _____ Zip Code: _____
Phone: _____ Fax: _____ E-mail: _____

About the Installer:

Name: _____
Address: _____ City: _____ State: _____ Zip Code: _____
Phone: _____ Fax: _____ E-mail: _____

Purchased From (if different than installer):

Name: _____
Address: _____ City: _____ State: _____ Zip Code: _____
Phone: _____ Fax: _____ E-mail: _____

About your Heater:

Model#: _____ Serial #: _____ Fuel: _____ Installation Date: _____

Type of Installation (check one):

Automotive Manufacturing Warehouse Recreational Aircraft
 Public Building Office Retail Agricultural Other _____

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 LLC 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 LLC 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 LLC.

These products are not for residential use.

This product is intended to assist licensed professionals in the exercise of their professional judgment.

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

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

Roberts-Gordon LLC
 1250 William Street
 P.O. Box 44
 Buffalo, NY 14240-0044 USA
 Telephone: +1.716.852.4400
 Fax: +1.716.852.0854
 Toll Free: 800.828.7450

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, operation and labeling 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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www.robertsgordon.com

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