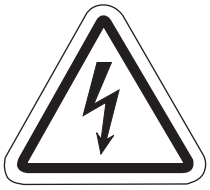
SECTION 16: OPERATION AND MAINTENANCE

⚠ 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.			

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

16.1 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. On CRV-Series systems equipped with the optional ROBERTS GORDON® System Control, or ROBERTS GORDON® ULTRAVAC™, the pump will continue operation for a post-purge period of two minutes.
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.

16.2 To Shut Off Heater

Set thermostat to lowest setting.
Turn OFF electric power to heater.
Turn OFF manual gas valve in the heater supply line.

16.3 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.

16.4 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 72, Section 16.5* for suggested items to inspect.

16.5 Maintenance Checklist

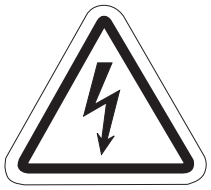
Installation Code and Annual Inspections:
All installation and service of ROBERTS GORDON® equipment must be performed by a contractor qualified in the installation and service of equipment sold and supplied by Roberts-Gordon and conform to all requirements set forth in the ROBERTS GORDON® manuals and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

The Vicinity of the Heater	Do not store or use flammable objects, liquids or vapors 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 24, Figure 7.4.3*. Clean outside surface with a damp cloth.
Vent Pipe	Venting must be intact. Using a flashlight, look for obstructions, cracks on the pipe or 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. *See Page 35, Section 9*.
Outside Air Inlet	Inlet must be intact. Look for obstructions, cracks on the pipe or 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 19, Figure 14 through Page 21, Section 7.2.1*. Make sure there is no dirt, sagging, bending or distortion. Clean or replace as required.

Gas Line	Check for gas leaks. *See Page 48, Figure 28*.
Combustion Chamber Window	Make sure it is clean and free of cracks or holes. Clean or replace as required.
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. *See Page 49, Section 12*.
Suspension Points	Make sure the heater is hanging securely. Look for signs of wear on the chain or ceiling. *See Page 19, Figure 14*.
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.) *See Page 31, Section 8.6.1 through Page 33, Section 8.7.3* Make sure shield is installed correctly and secured in place if necessary. (Decorative grille only.) *See Page 31, Section 8.6.2*.
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. *See Page 4, Section 2.1*.

SECTION 17: 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 to an electrical source.

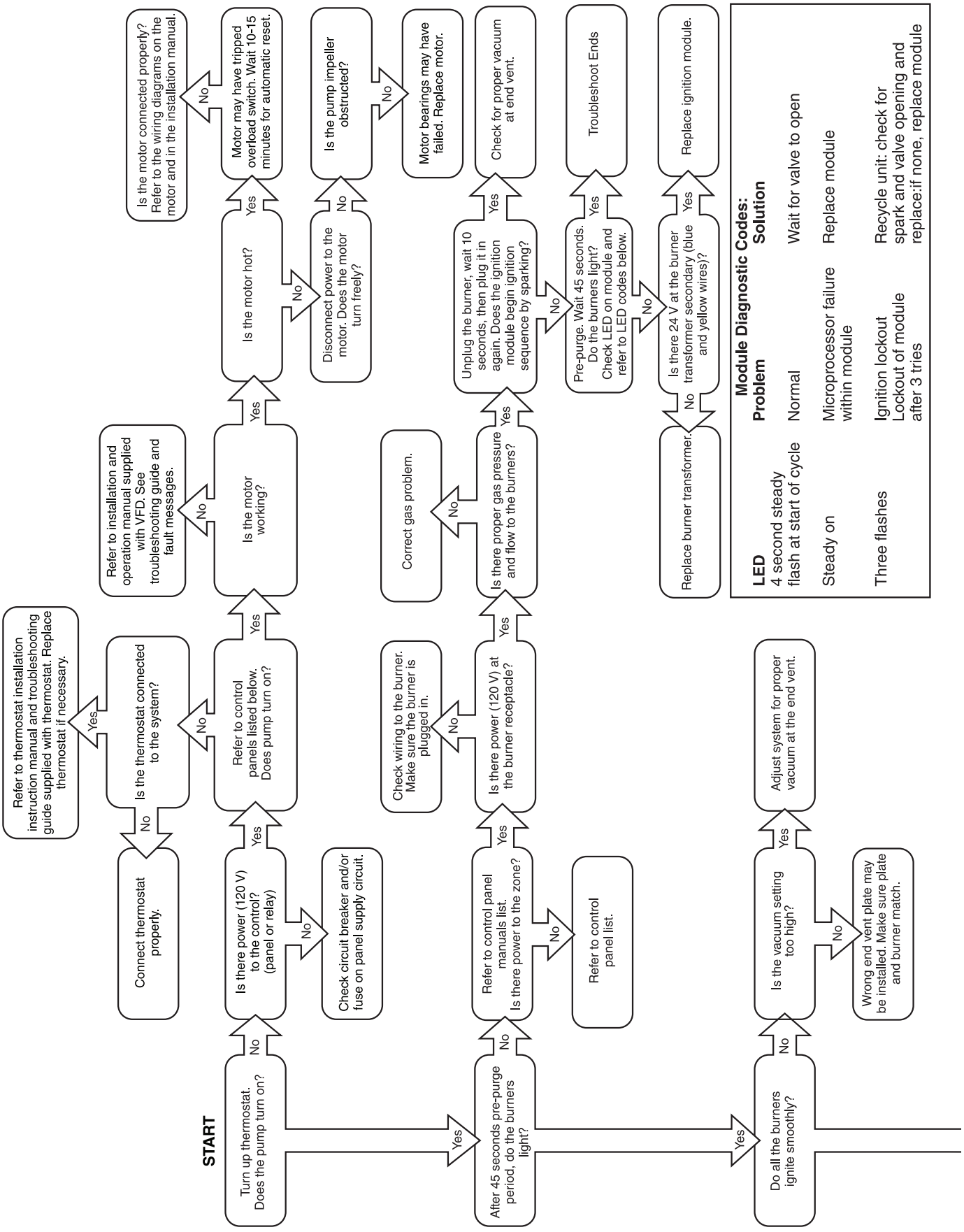
Failure to follow these instructions can result in death or electrical shock.

⚠ WARNING

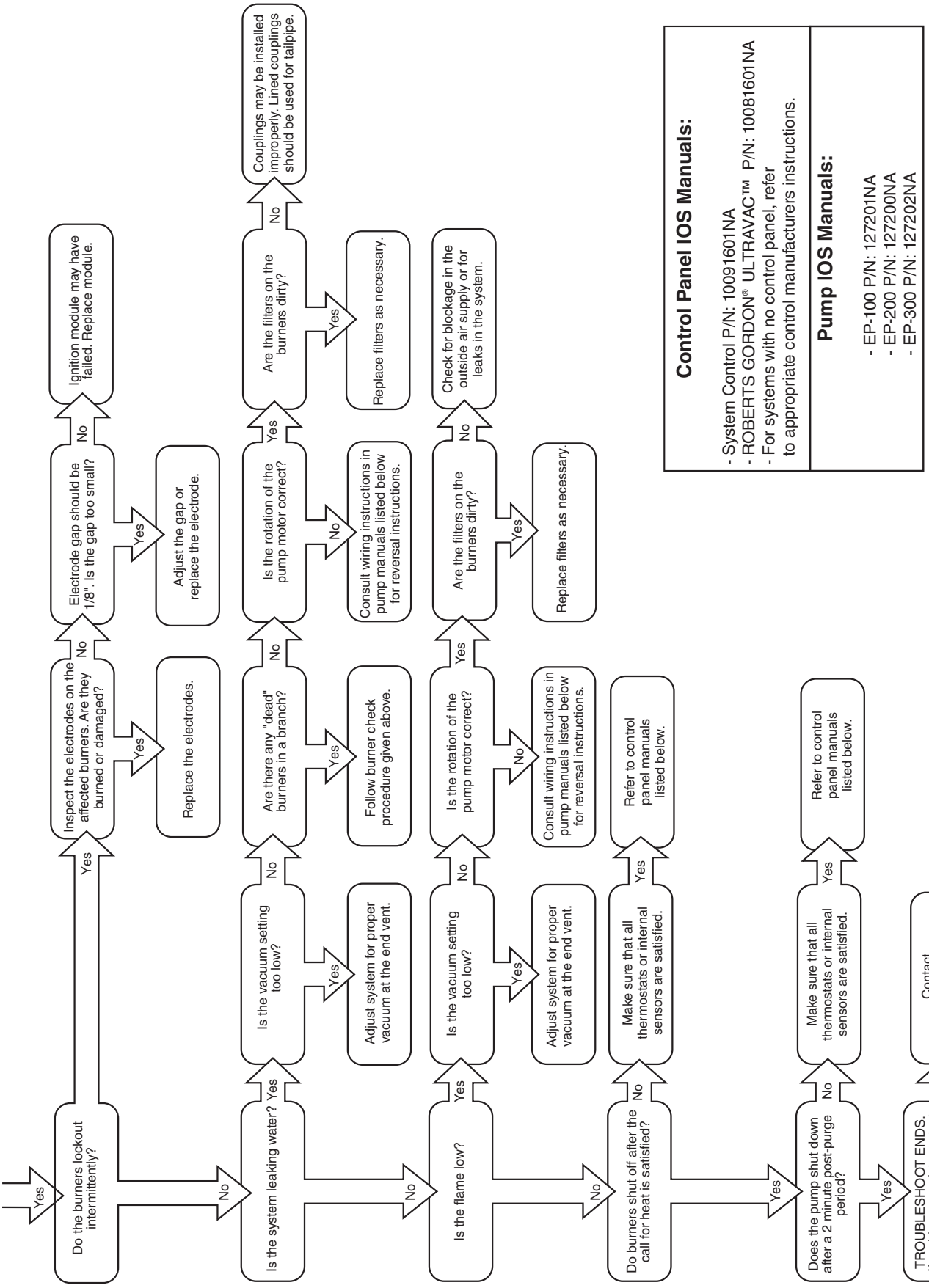
			
Fire Hazard	**Explosion Hazard**	**Burn Hazard**	**Cut/Pinch Hazard**
Keep all flammable objects, liquids and vapors the minimum required clearances to combustibles away from heater. **Some objects will catch fire or explode when placed close to heater.**	**Turn off gas supply to heater before service.**	**Allow heater to cool before service.** **Tubing may still be hot after operation.**	**Wear protective gear during installation, operation and service.** **Edges are sharp.**

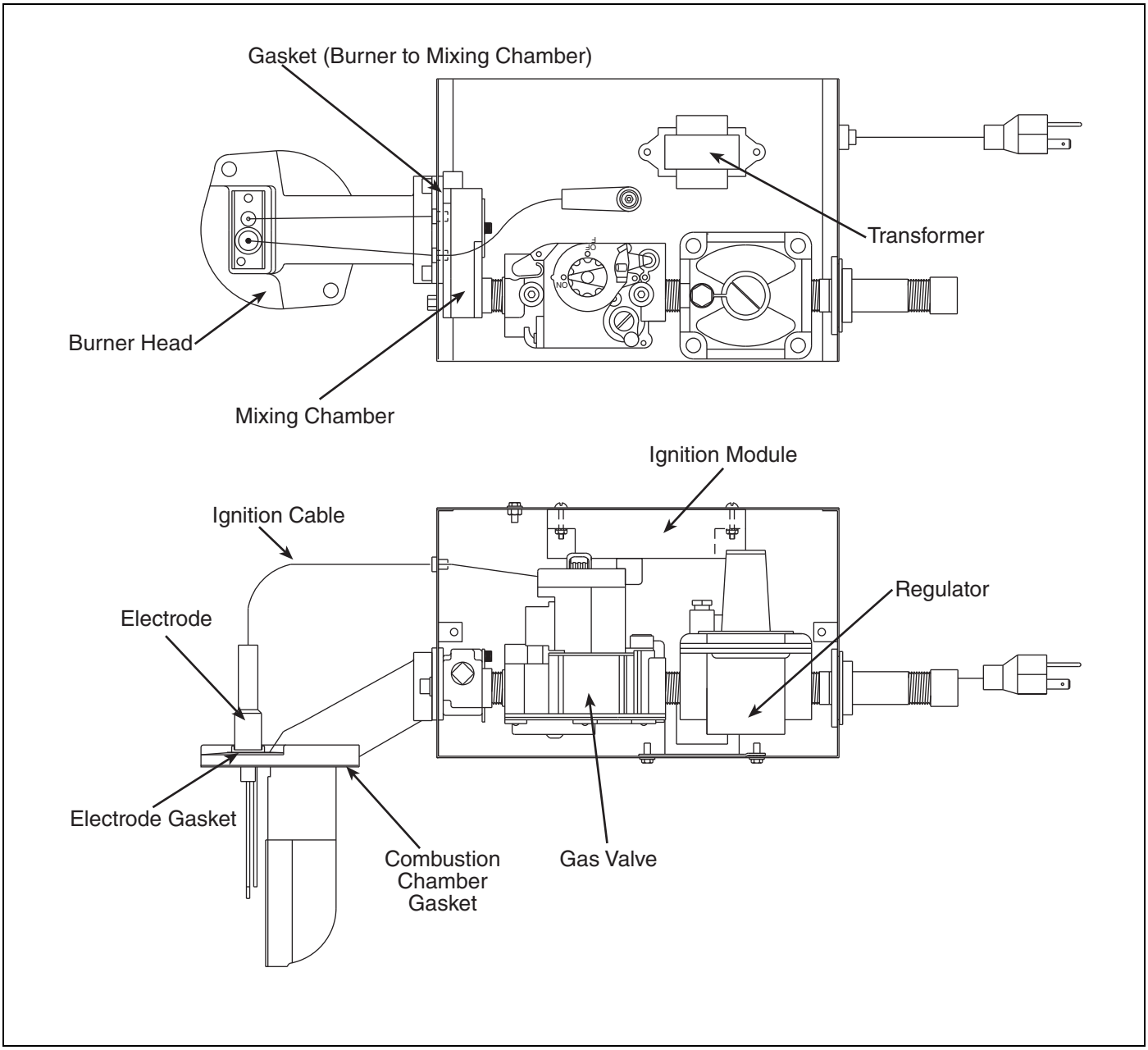
Failure to follow these instructions can result in death, injury or property damage.

17.1 Troubleshooting Flow Chart



Troubleshooting Flow Chart





Description	Part Number
Gas Valve (All Burners)	90032502
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
Gasket (Combustion Chamber)	01367800
Electrode Replacement Kit (includes electrode, electrode gasket and mounting screws)	02713200
Ignition Module	90439500K
Ignition Cable	90427706
Filter Cartridge with Gasket (not shown)	01312401

SECTION 19: GENERAL SPECIFICATIONS

19.1 Material Specifications

19.1.1 Reflectors

.024 Aluminium (Optional - 024 Stainless Steel Type 304).

19.2 Heater Specifications

19.2.1 Ignition

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

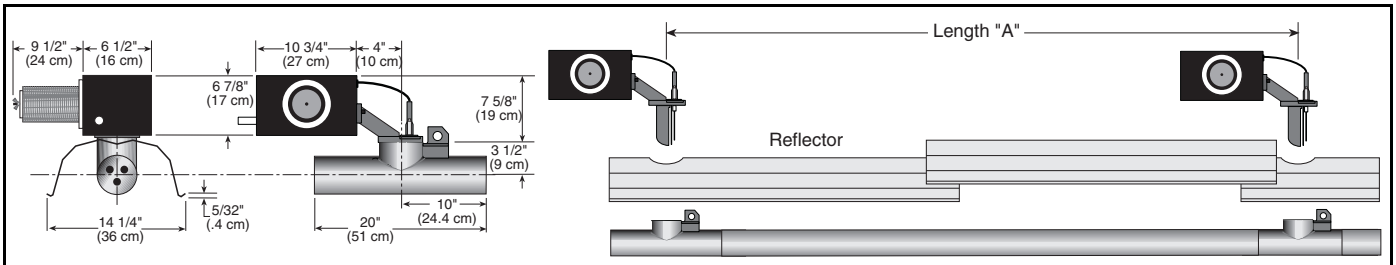
19.3 Suspension Specifications

Hang heater with materials with a minimum working load of 75 lbs (33 kg). *See Page 19, Figure 14*.

19.4 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:



Model	Heat Input Rate (Btu/h) x (1000)	Length "A"		Recommended Minimum Mounting Height*
		Minimum	Maximum	Spot Heating
CRV-B-2 (NG only)	20	10' (3 m)	20' (6.1 m)	8' (2.4 m)
CRV-B-4	40	12.5' (3.8 m)	25' (7.6 m)	8' (2.4 m)
CRV-B-6	60	20' (6.1 m)	35' (10.7 m)	8' (2.4 m)
CRV-B-8	80	20' (6.1 m)	45' (13.7 m)	10' (3 m)
CRV-B-9	90	25' (7.6 m)	50' (15.2 m)	10' (3 m)
CRV-B-10	100	30' (9.1 m)	60' (18.3 m)	15' (4.5 m)
CRV-B-12A (NG only)	110	35' (10.7 m)	70' (21.3 m)	15' (4.5 m)
CRV-B-12 (LP only)	120	35' (10.7 m)	70' (21.3 m)	15' (4.5 m)

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

PIPE CONNECTION:
1/2" NPT

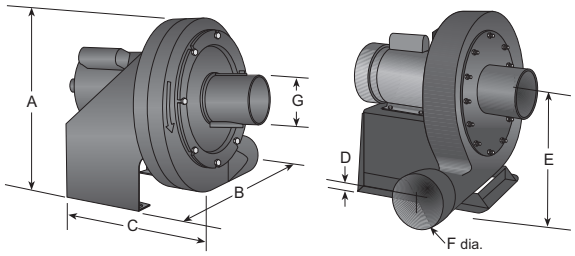
DIMENSIONS:
Vent Connection Size: 4" (10 cm) or 6" (15 cm)
Outside Air Connection Size: 4" (10 cm)
Refer to figure above for dimensional information.

GAS INLET PRESSURE:
Natural Gas: 4.5" wc Minimum 14.0" wc Maximum
LP Gas: 10.5" wc Minimum 14.0" wc Maximum

ELECTRICAL RATING:
120 V - 60 Hz, 0.3 A

General Specifications for pumps are as follows:

Pump Dimensional Data (in.)							
Model	**A**	**B**	**C**	**D**	**E**	**F**	**G**
EP-100	17	14.5	21	3.75	10	4	4
EP-201/203	17.75	17	20.25	3.25	10	4.5	4.5
EP-301/303	25.6	24.8	22.7	4.8	15.2	6	6



Pump Specifications

Model	EP-100	EP-201	EP-203	EP-301	EP-303
Horsepower (Hp)	1/3	3/4	3/4	2*	2*
Phase (Ø)	1	1	3	1	3
Hertz (Hz)	60	60	60	60	60
Voltage (V)	115/230	115/230	208-230/460	208-230	208-230/460
Full Load Amp (Amps)	4.8/2.4	6.6/3.3	2.4-2.2/1.1	12.8-11.5	5.5-5.2/2.6
R.P.M.	3450	3450	3500	3450	3450
Motor Frame	56	56	56	90	90
Motor Enclosure	TENV	TENV	TEFC	TEFC	TEFC
Noise Level @ 5' (DBA)	-	70	70	-	-
Inlet/Outlet (In.)	4/4	4/4	4/4	6/6	6/6
Weight (lbs.)	62	112	112	170	170

** For starter, see National Electric Code (NEC) requirement for motors 1 hp or higher.*

Air Supply Blower Specifications	
Capacity	240 CFM @ 0.75 in wc
Power (W)	167
Phase	1
Hertz (Hz)	60
Voltage (V)	120
Full Load Amp (Amps)	1.5
R.P.M.	3000
Motor Enclosure	OPEN FC
Inlet/Outlet (In.)	5/5
Weight (lbs.)	10